



SURVEY RESULTS

ProSafe Delphi Poll

Is risk management on pace with innovation for nanomaterial uses?

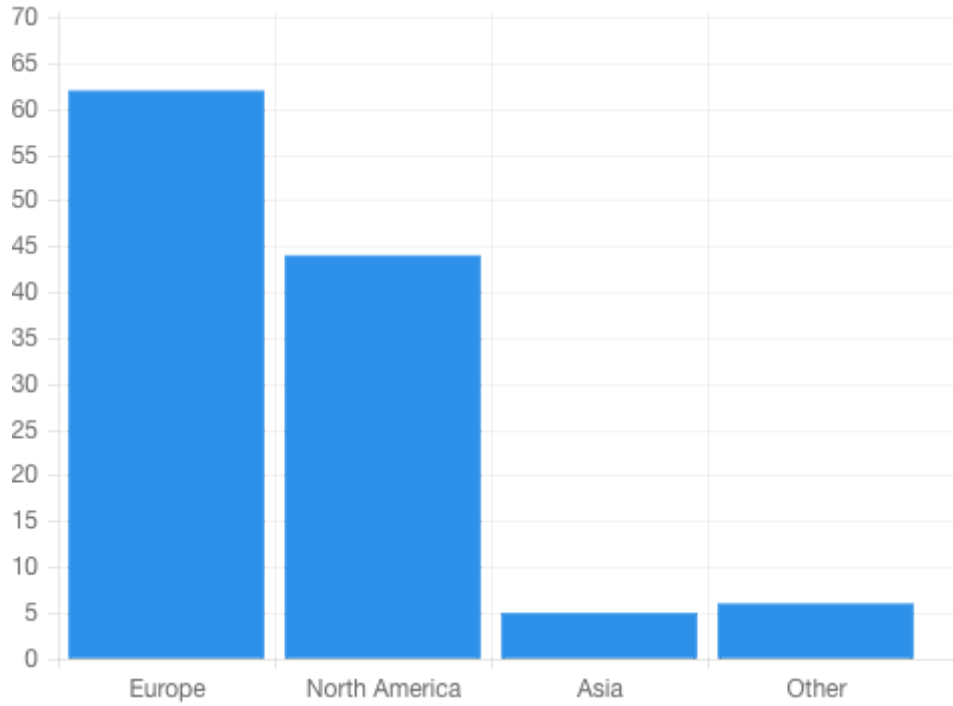
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SECTION: PLEASE PROVIDE INFORMATION ABOUT YOURSELF

ID #1550 (<https://scipinion.com/surveys/64/results/1550>)

Region



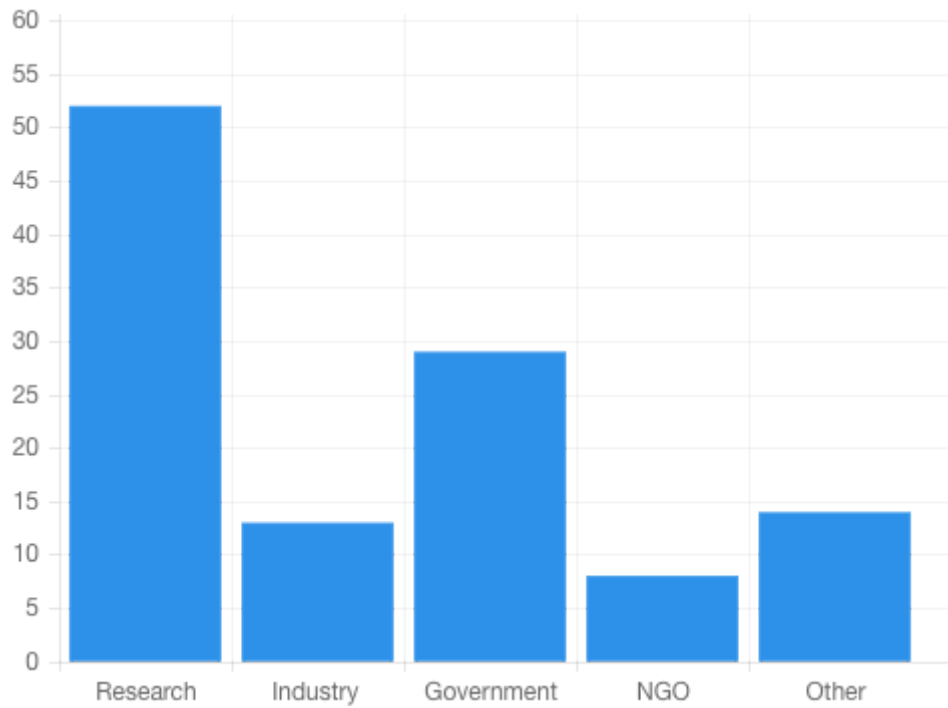
Legend

answers: 117

skips: 1

ID #1551 (<https://scipinion.com/surveys/64/results/1551>)

Employment sector



Legend

answers: 116

skips: 2

ID #1552 (<https://scipinion.com/surveys/64/results/1552>)

If you selected the Other option above, please specify your sector in the text box provided.

Oceania

Education - University

I'm representing both, governmental research and industry!

Already retired, previously governmental agency

Consultancy Services

Independent consultant (retired from government service)

Consultancy

Technology consultant and safety research

Research Institute

Independent . Collaborate with all listed sectors.

Education - faculty member

Association/ working group

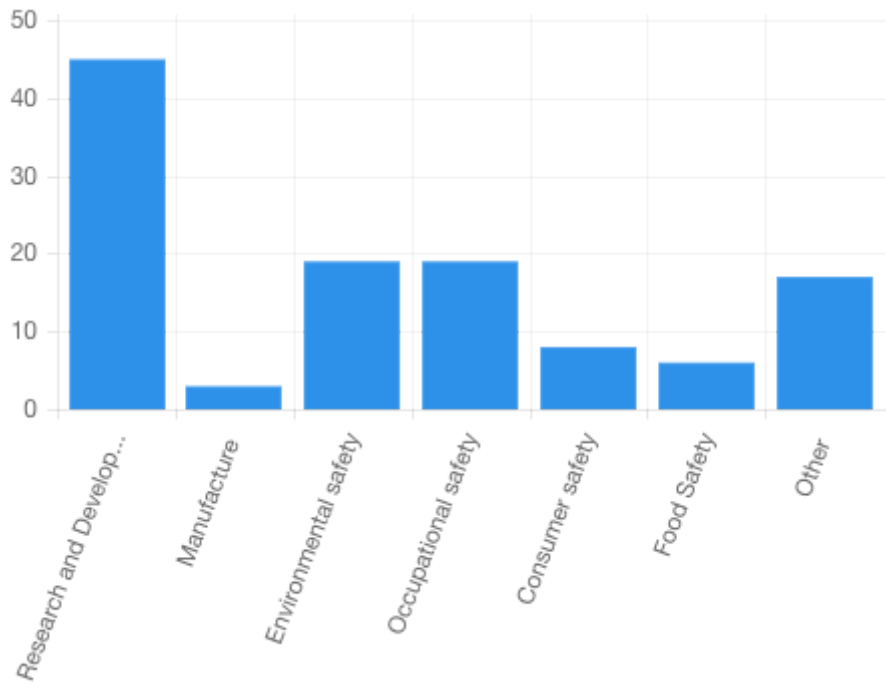
Consulting

governmental research institute

consultancy

ID #1553 (<https://scipinion.com/surveys/64/results/1553>)

Category for the majority of work.



Legend

answers: 117

skips: 1

ID #1554 (<https://scipinion.com/surveys/64/results/1554>)

If you selected the Other option above, please specify a category that best describes the majority of your work in the text box provided.

A combination of the above.

Education and Research

REACH implementation, human health regulatory toxicology and risk assessment

Public and Regulatory Affairs

Regulation of tobacco products

all categories. I work across disciplines to assess environmental health, product safety and sustainability issues along the chain of commerce, with special focus on uncertainty analysis, and research and risk assessment on new technologies.

Metrology

Metrology

First is human health related research and second is consulting companies and other "nano-users"

sustainability

Environmental (human health, ecological, human welfare) risk assessment and research planning to support risk assessment

Several of the above

legal framework for the safe development (health and environmental) of MNMs

Occupational, environmental consumer and food related work.

Environmental Health and Toxicology

Environmental and Occupational Hygiene

regulatory risk assessment

ID #1555 (<https://scipinion.com/surveys/64/results/1555>)

Level of training and experience in the following areas.

	None	1-4 years	5-10 years	>10 years	Total
Material science/chemistry	18.81% 19	14.85% 15	15.84% 16	50.50% 51	101
Toxicology	15.60% 17	30.28% 33	23.85% 26	30.28% 33	109
Exposure science	16.16% 16	34.34% 34	17.17% 17	32.32% 32	99
Risk Assessment	9.43% 10	24.53% 26	23.58% 25	42.45% 45	106
Nanomaterial applications	7.77% 8	21.36% 22	40.78% 42	30.10% 31	103
Product stewardship	62.50% 55	13.64% 12	10.23% 9	13.64% 12	88
Public health	32.29% 31	18.75% 18	19.79% 19	29.17% 28	96
Finance or insurance	83.53% 71	14.12% 12	1.18% 1	1.18% 1	85
Other	67.65% 23	5.88% 2	5.88% 2	20.59% 7	34

ID #1556 (<https://scipinion.com/surveys/64/results/1556>)

Amount of career effort in the sectors of use considered in the poll

	Most of my work	Part of my work	None of my work	Total
Food additive/packaging	9.38% 9	47.92% 46	42.71% 41	96
Construction	1.05% 1	36.84% 35	62.11% 59	95
Electronics/optics	1.09% 1	41.30% 38	57.61% 53	92
Agriculture	9.57% 9	40.43% 38	50.00% 47	94
Advanced composites	15.31% 15	51.02% 50	33.67% 33	98
Medical	13.40% 13	50.52% 49	36.08% 35	97
Other	45.16% 28	24.19% 15	30.65% 19	62

ID #1616 (<https://scipinion.com/surveys/64/results/1616>)

If you selected the Other option above, please specify the sectors in which your work has a focus.

Knowledge Management

Not a specific sector but safety and health at work in many sectors.

consumer products and occupational exposure

environmental protection risk assessment policy development and research programming

environmental protection risk assessment policy development and research programming

Measurement Technology

synthesis of nanomaterials and catalysis

Nanomaterials (coagulants and membranes) for water treatment

Research

EU chemical regulatory frameworks (REACH and biocides)

industrial chemicals

Research on physical-chemical and thermodynamic properties of nanomaterials

governmental (policy advice)

Method development for safety testing.

Environmental fate and transport

Metrology as a discipline transversal to several sectors

development of reference materials

any workplaces handling nanomaterials

all nanomaterials which may be used in different products totally independent of its specific use!

environmental remediation

I am not working on a special sector of NM applications but in General on NM characterisation and risk assessment

personal care cosmetics, food & feed additives

Chemicals

My work has been on (risk) implications rather than applications of engineered nanomaterials, although I have focused on specific consumer product applications.

Energy sector

Nanomaterial based product development for cosmetic and consumer applications

waste treatment, water treatment

Chemicals, Metals, Alloys

Environmental Technology

Consumer and environmental safety

Energy nanomaterials and nanostructured membranes for water filtration.

communication

risk assessment

I have been working with the environmental health and toxicology issues of nanosilver in all market sectors.

I work about funding new technologies

Transportation Chemicals and Materials

environmental risk management

Coatings, consumer products

chemical sensors, biosensors

Supporting safe development and use of nanomaterials across a wide range of use sectors.

innovation, risk assessment

Research into risk management and safety of nanomaterials to support innovation research projects

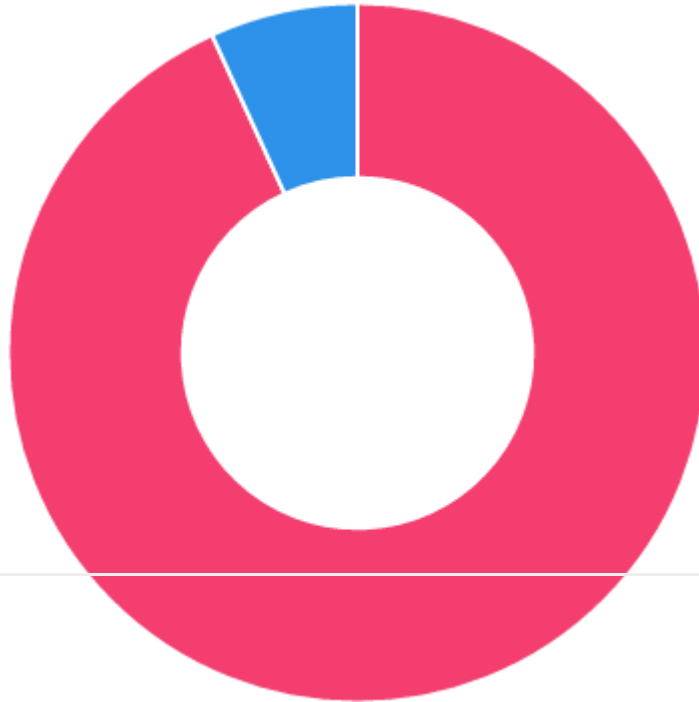
Any sector to which we are contracted to provide risk assessment research.

Printing, Inks and Pigments Industry

home and personal care products

ID #1561 (<https://scipinion.com/surveys/64/results/1561>)

A copy of the anonymised data (i.e. without email addresses and login information) collected through this survey will be sent to IOM for further analysis. The IOM intends to make this data publicly available. If you do not wish your responses to be included in this public database please check the opt out box.



Legend

OK to use : 109 (93%)

Opt out: 8 (7%)

answers: 117

skips: 1

SECTION: GENERAL RISK ASSESSMENT/MANAGEMENTID #1557 (<https://scipinion.com/surveys/64/results/1557>)

Knowledge of use or risk management for Manufactured Nanomaterials (MNM) in these material categories.

MNM	None	Working knowledge	Specialist	Total
Titanium dioxide	5.17% 6	68.10% 79	26.72% 31	116
Silicon dioxide	18.92% 21	63.06% 70	18.02% 20	111
Cerium oxide	39.25% 42	45.79% 49	14.95% 16	107
Barium sulphate	67.68% 67	27.27% 27	5.05% 5	99
Silver	11.21% 13	64.66% 75	24.14% 28	116
Carbon nanotubes	13.16% 15	60.53% 69	26.32% 30	114

ID #1559 (<https://scipinion.com/surveys/64/results/1559>)

Where is Safe by Design already in practice for new use development for MNMs?

Life Cycle Stage / Sector of Use	Considering manufacturing	Considering professional use	Considering consumer use	Considering end of life / environmental	Check all	Total
Food additives/packaging	29.66% 35	20.34% 24	35.59% 42	16.10% 19	13.56% 16	118
Construction	29.66% 35	18.64% 22	13.56% 16	11.02% 13	5.08% 6	118
Agriculture	22.03% 26	15.25% 18	10.17% 12	14.41% 17	8.47% 10	118
Advanced composites	38.14% 45	23.73% 28	16.10% 19	11.86% 14	10.17% 12	118
Electronics/optics	30.51% 36	19.49% 23	11.86% 14	9.32% 11	7.63% 9	118
Medical	21.19% 25	29.66% 35	33.05% 39	10.17% 12	12.71% 15	118

ID #1560 (<https://scipinion.com/surveys/64/results/1560>)

What kinds of actions would be most effective to improve our ability to adopt more widespread Safe by Design practices for uses of MNMs?

Sector of use	Leave it alone - it is already here	Standards/best practice	More research	New regulations/laws	Other	Total
Food additives and packaging	4.24% 5	51.69% 61	58.47% 69	33.90% 40	10.17% 12	118
Construction	2.54% 3	46.61% 55	50.00% 59	22.88% 27	10.17% 12	118
Agriculture	2.54% 3	41.53% 49	58.47% 69	38.14% 45	10.17% 12	118
Advanced composites	4.24% 5	47.46% 56	55.08% 65	21.19% 25	11.86% 14	118
Electronics/optics	5.93% 7	44.07% 52	44.92% 53	22.88% 27	11.86% 14	118
Medical	7.63% 9	47.46% 56	58.47% 69	34.75% 41	8.47% 10	118

ID #1622 (<https://scipinion.com/surveys/64/results/1622>)

If you chose Other, please provide one or two words to describe what you mean.

Worker participation on risk management

The risk assessment tools and knowledge to develop, carry out and implement safe by design strategies are already there. Effort needs to be put in finding the incentives for companies to invest in Safe by design. And research needs to be done to match the necessary investments to the R&D stage of a product.

there are neough rules. Do not complicate the life of innovators.

For Advanced Composites and Medical there is a need to evaluate the end of life and for Advanced Composites the recycling of some strategic elements

Awareness Sharing (confidential) information

global network information (including emerging economies)

So far there are only a few and mostly big companies considering the Safe-by-Design paradigm. To ensure this paradigm for most of the companies the idea of green chemistry and green toxicology should be introduced. This needs in the first line better education on all levels.

Industry is of course always trying to avoid the development of unsafe products, as that would hamper any application. Hence , safe by design is always applied. Yet, more and better manners can be sought to apply it better and thereby improving the safety of products, for example by making use of safe-of-the-art knowledge of risks.

Life Cycle Assessment needs to be done looking at release and exposure scenarios at each point on the life cycle for each product and developing product refinement and standards based on results.

Safe-by-design not defined

Non-mandatory but incentivized governance approaches

first define which information is needed in SbD; pay more attention on how to organise SbD rather than focusing on scientific content

priority should be on standards/best practise, followed by regulation and in some cases more research and development is needed to ensure good implementation.

Need for increase emphasis on end of life provisions including modifying persistence to enable materials to degrade safely after their useful life

SECTION: CURRENT USES AND RISK MANAGEMENT FOR SELECTED MNM

ID #1615 (<https://scipinion.com/surveys/64/results/1615>)

The intention of the next section is to seek your opinion on exposure, toxicity, and risk assessment/management for a selection of nanoscale materials. PLEASE CHOOSE AT LEAST ONE OF THE NANOMATERIAL TYPES ON THE LEFT. We are seeking to explore effects of expertise on perceptions related to risk management, so please answer regardless of your level of experience with these materials. If you simply hit Next below you will be taken to the first of the materials (Titanium Dioxide). Alternatively you can select any of the nanomaterials by using the menu on the left.

		Total
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SECTION: - TITANIUM DIOXIDEID #1575 (<https://scipinion.com/surveys/64/results/1575>)

For each sector of use, which life cycle stage has the highest exposure potential for manufactured nanoscale TITANIUM DIOXIDE.

Life cycle/ Sector of use	Manufacture	Professional use	Consumer use	End of life / environmental	Not applicable	Total
Food additives/packaging	29.87% 23	2.60% 2	50.65% 39	12.99% 10	3.90% 3	77
Construction	29.17% 21	36.11% 26	2.78% 2	22.22% 16	9.72% 7	72
Agriculture	13.89% 10	27.78% 20	11.11% 8	23.61% 17	23.61% 17	72
Advanced composites	55.41% 41	13.51% 10	8.11% 6	18.92% 14	4.05% 3	74
Electronics / optics	45.95% 34	5.41% 4	2.70% 2	31.08% 23	14.86% 11	74
Medical	22.67% 17	9.33% 7	57.33% 43	2.67% 2	8.00% 6	75

ID #1576 (<https://scipinion.com/surveys/64/results/1576>)

Where is it likely that biologically relevant exposure may occur to nanoscale TITANIUM DIOXIDE as it was manufactured.

Life cycle / Sector of use	Manufacture	Professional use	Consumer use	End of life/environmental	Check all	Not applicable	Total
Food additives/packaging	27.97% 33	11.86% 14	28.81% 34	16.95% 20	9.32% 11	6.78% 8	118
Construction	29.66% 35	30.51% 36	8.47% 10	22.03% 26	5.08% 6	6.78% 8	118
Agriculture	16.95% 20	20.34% 24	14.41% 17	22.88% 27	5.08% 6	12.71% 15	118
Advanced composites	33.90% 40	20.34% 24	7.63% 9	24.58% 29	5.93% 7	5.08% 6	118
Electronics/optics	29.66% 35	12.71% 15	5.93% 7	22.03% 26	2.54% 3	11.02% 13	118
Medical	21.19% 25	14.41% 17	27.12% 32	11.86% 14	9.32% 11	8.47% 10	118

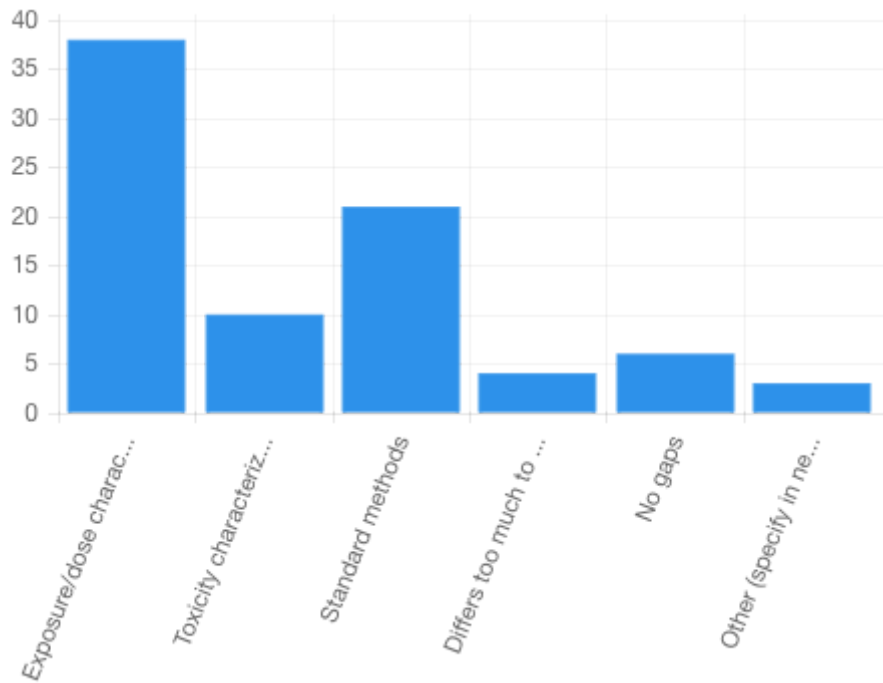
ID #1577 (<https://scipinion.com/surveys/64/results/1577>)

Check the boxes to indicate where you are confident that risk management for nanoscale TITANIUM DIOXIDE can be supported with current methods.

Life Cycle Stage / Sector of Use	Manufacture	Professional use	Consumer use	End of life / environmental	Check all as confident	Not applicable	Total
Food additives/packaging	27.97% 33	23.73% 28	18.64% 22	6.78% 8	18.64% 22	5.93% 7	118
Construction	31.36% 37	17.80% 21	14.41% 17	9.32% 11	13.56% 16	5.93% 7	118
Agriculture	24.58% 29	13.56% 16	17.80% 21	4.24% 5	11.02% 13	11.86% 14	118
Advanced composites	28.81% 34	24.58% 29	16.10% 19	10.17% 12	14.41% 17	5.08% 6	118
Electronics/optics	25.42% 30	20.34% 24	16.10% 19	8.47% 10	14.41% 17	11.02% 13	118
Medical	26.27% 31	22.03% 26	16.95% 20	8.47% 10	19.49% 23	8.47% 10	118

ID #1578 (<https://scipinion.com/surveys/64/results/1578>)

What is the biggest gap in methods to support risk management for nanoscale TITANIUM DIOXIDE?



Legend

answers: 82

skips: 36

ID #1579 (<https://scipinion.com/surveys/64/results/1579>)

Please give a short (one or two words if possible) response to clarify your choice of other above.

The area of exposure has the highest complexity and the lowest research data/

The area of exposure has the highest complexity and the lowest research data/

The overall outcome is fairly well defined, but the biological effects at a (epi)genomic/systems biology level for the full exposure/dose/chemical structure factor space is ill defined. Physicochemical characterization is too minimal, and it is unclear if surface modified nanoTiO₂ is included in this question or not (including impurities, biological coronas, etc, etc).

life cycle transformation is making the hazard assessment overbearing exposure data are lacking worst case exposure scenario's have too many safety factors

life cycle transformation is making the hazard assessment overbearing exposure data are lacking worst case exposure scenario's have too many safety factors

The fact that photo-catalytically active TiO₂ was found in certain sunscreens should call for setup and enforcement of minimum product standards.

Big differences in literature, usually toxicity tests lack of proper material characterization

environmentally relevant concentrations not yet characterisable

comparable results

Its mostly in standardization, but important gaps also exist for complex nano TiO₂ structures in exposure/dose characterization and toxicity. especially for applications involving complex matrices and the transformational effects on substances in contact with it.

Depends on the situation (use and life cycle stage)

agglomeration at unrealistic doses

toxicity profile is very good. exposure profile difficult to ascertain - but not unique for a nanomaterial

Little information available on exposure to titanium oxide in the digestive tract or fate and transport to blood or brain. Transport through the ecosystem is also unclear.

need agreed upon methods

TiO₂ is one of the most investigated materials with no indication for any severe effect in living organisms at the level of use (concentrations/doses). There is no reason of concern for this material!

Difficult to distinguish from background Ti

recognized & agreed test methods

much is needed in both exposure/dose characterization; Toxicity characterisation and standards methods

due to its particulate nature NM is difficult to accurately locate and quantify when in contact with living organism

Effects and exposure levels to mixtures

Not all nanoscale TiO₂ are the same. Toxicity is a function of particle size, quantity, and entry points.

lack of standardization of tests to assess human exposure

There is not enough methodology able to reproduce data

As far as I am aware, no one has conducted toxicity on the nanoparticles so they cannot say what is a safe dose

we know very little about nanoparticle surface characteristics at the point(s) of exposure. and, there are now data showing biotransformations. Without this knowledge, it is not clear what we should be doing risk assessment on.

cross effects with other frequently-encountered substances

long-term studies carcinogenic risk

standardized methods and guidelines

form post incorporation

thousands of publications on substance. recent reviews on effects.

Needs of repeatable, reproducible protocols including sampling and preparation.

there is not established technique for routine sensitive measurements of nanoparticles

Dose characterization is still a challenge

Missing paint, toner, catalyst, sunscreen uses

Comparability it needed to actually ensure implmentation. No real assessment can be done when values a determined differently, exposure as well as hazard.

Relatively speaking, TiO₂ is the best characterized and investigated MNM yet given its varying uses, outside bulk production relatively little is known about exposure levels and characteristics (e.g. PSD, MMAD etc.) which are crucial bits of information to inform proper risk assessment and better, more representative toxicology

analysis and characterisation of exposure is very challenging. Further clarification of metrics would be beneficial.

Standards need to be developed to assess the effects of titanium dioxide across different industries. Currently, the standards used by the food and construction industries, for example, are quite different.

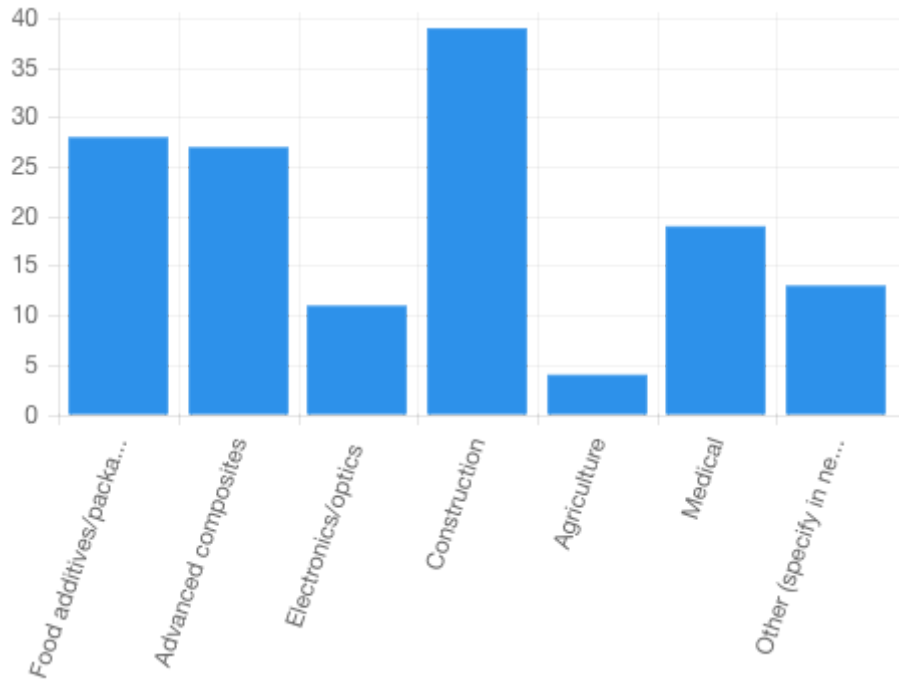
ID #1580 (<https://scipinion.com/surveys/64/results/1580>)

Where is the best point to control risk for nanoscale TITANIUM DIOXIDE uses?

Sector of use / Risk control point	MNM design	Design of use	Controls during use	Monitoring exposures	Risk communication	Not applicable	Total
Food additives/packaging	23.08% 18	35.90% 28	11.54% 9	8.97% 7	14.10% 11	6.41% 5	78
Construction	17.57% 13	24.32% 18	21.62% 16	21.62% 16	10.81% 8	4.05% 3	74
Agriculture	18.42% 14	15.79% 12	18.42% 14	23.68% 18	9.21% 7	14.47% 11	76
Advanced composites	22.08% 17	31.17% 24	14.29% 11	11.69% 9	15.58% 12	5.19% 4	77
Electronics/optics	16.90% 12	25.35% 18	8.45% 6	15.49% 11	19.72% 14	14.08% 10	71
Medical	23.68% 18	30.26% 23	11.84% 9	9.21% 7	11.84% 9	13.16% 10	76

ID #1581 (<https://scipinion.com/surveys/64/results/1581>)

Where will use at least double for nanoscale TITANIUM DIOXIDE in the next 5-10 years?



Legend

answers: 79

skips: 39

ID #1582 (<https://scipinion.com/surveys/64/results/1582>)

If you selected the Other option above, please identify where you believe more than a doubling in use of nanoscale TITANIUM DIOXIDE will occur in the next 5-10 years.

No idea.

Cosmetics

Disease-control

Cosmetics and personal care products

Textiles

sunscream, cosmetics

don't know

Cosmetics & other dermal applications

do not know

water treatment (as catalysis for depollution), Solar cell, paint and coatings (catalysis for depollution)

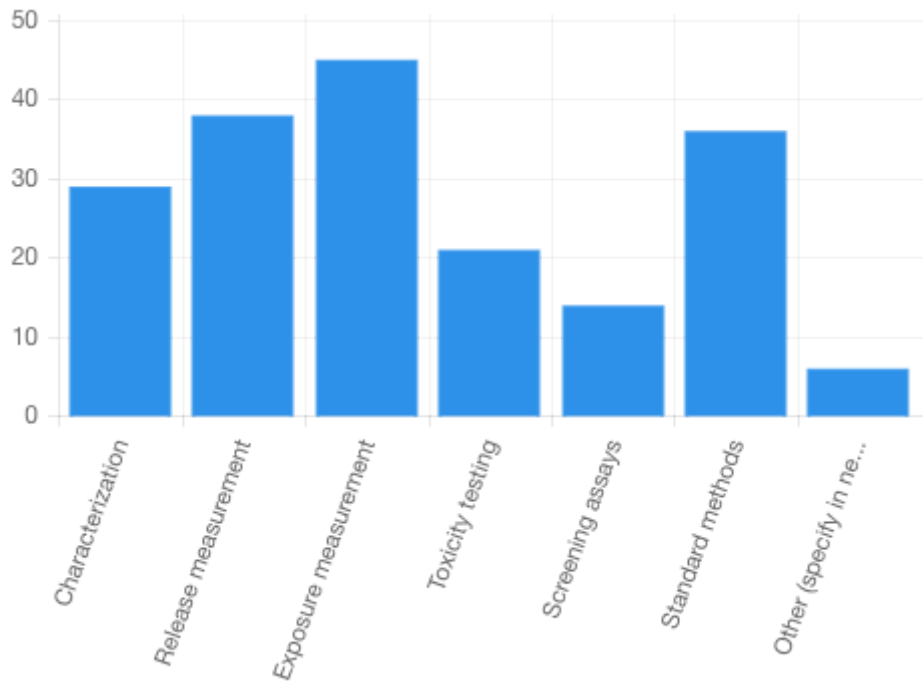
coatings

Unkown

consumer products

ID #1583 (<https://scipinion.com/surveys/64/results/1583>)

What developments will be most important in improving risk assessment for new uses of nanoscale TITANIUM DIOXIDE? (Select no more than 3)



Legend

answers: 84

skips: 34

ID #1584 (<https://scipinion.com/surveys/64/results/1584>)

If you selected the Other option above, please identify what other developments you think will be most important in improving risk assessment for new uses of nanoscale TITANIUM DIOXIDE in the next 5-10 years.

Knowledge Management (availability of data, etc)

Grouping and read across approaches

Release and exposure measurement methods involving life cycle transformations and complex structures and matrices

Identification of sensitive health and ecological endpoints for adverse effects specific to nano TiO₂ in different forms at various life cycle stages

cross-toxicities issues (carrier effect, toxic synergies etc...)

no need to improve. risk assessment can be established

ID #1585 (<https://scipinion.com/surveys/64/results/1585>)

Where will exposure to nanoscale TITANIUM DIOXIDE change (per individual user or exposed population) in the next 5-10 years?

	Decrease	Same	Increase	Total
Food additives/packaging	9.59% 7	24.66% 18	65.75% 48	73
Advanced composites	1.37% 1	43.84% 32	54.79% 40	73
Electronics/optics	1.56% 1	67.19% 43	31.25% 20	64
Construction	1.41% 1	22.54% 16	76.06% 54	71
Agriculture	5.63% 4	59.15% 42	35.21% 25	71
Medical	2.82% 2	53.52% 38	43.66% 31	71

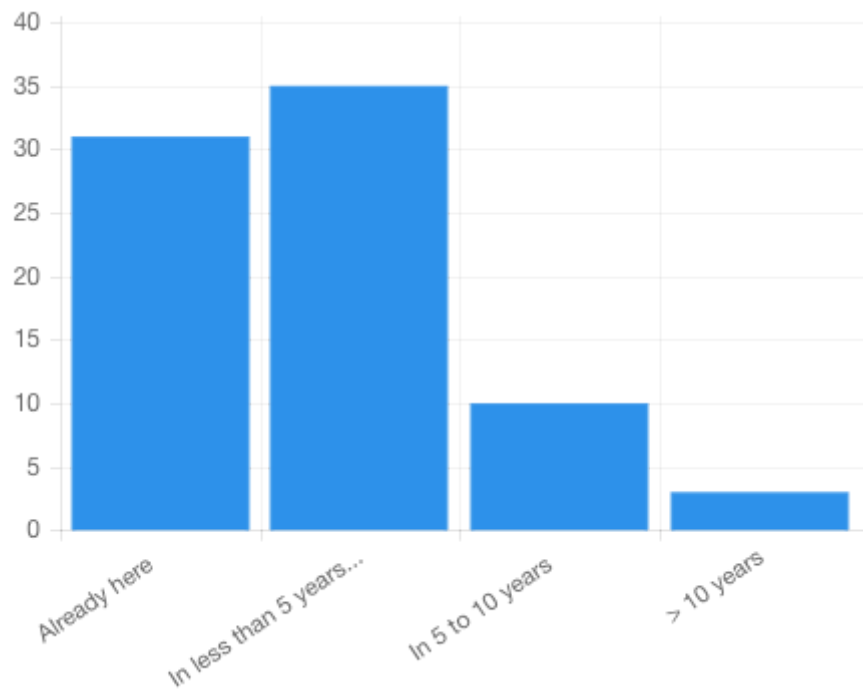
ID #1586 (<https://scipinion.com/surveys/64/results/1586>)

WHEN do you believe EXPOSURE ASSESSMENT METHODS for nanoscale TITANIUM DIOXIDE will be adequate to make decisions on risk management?

Life cycle stage	Already here	In less than 5 years	In 5 to 10 years	> 10 years	Total
Manufacture	44.44% 36	43.21% 35	11.11% 9	1.23% 1	81
Professional use	35.00% 28	45.00% 36	18.75% 15	1.25% 1	80
Consumer use	23.75% 19	35.00% 28	37.50% 30	3.75% 3	80
End of life/environmental	13.92% 11	32.91% 26	40.51% 32	12.66% 10	79

ID #1617 (<https://scipinion.com/surveys/64/results/1617>)

WHEN do you believe TOXICITY ASSESSMENT METHODS for nanoscale TITANIUM DIOXIDE will be adequate to make decisions on risk management?



Legend

answers: 79

skips: 39

ID #1618 (<https://scipinion.com/surveys/64/results/1618>)

Thanks for completing the questions for TITANIUM DIOXIDE. You can now either click on the tab to the left or continue on to CARBON NANOTUBES by clicking next.

		Total
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SECTION: - CARBON NANOTUBESID #1562 (<https://scipinion.com/surveys/64/results/1562>)

For each sector of use, which life cycle stage has the highest exposure potential for manufactured CARBON NANOTUBES?

Life cycle/ Sector of use	Manufacture	Professional use	Consumer use	End of life / environmental	Not applicable	Total
Food additives/packaging	20.97% 13	3.23% 2	14.52% 9	9.68% 6	51.61% 32	62
Construction	42.62% 26	26.23% 16	9.84% 6	16.39% 10	4.92% 3	61
Agriculture	18.64% 11	10.17% 6	8.47% 5	11.86% 7	50.85% 30	59
Advanced composites	67.19% 43	9.38% 6	6.25% 4	15.63% 10	1.56% 1	64
Electronics / optics	59.38% 38	9.38% 6	7.81% 5	18.75% 12	4.69% 3	64
Medical	31.67% 19	5.00% 3	26.67% 16	5.00% 3	31.67% 19	60

ID #1563 (<https://scipinion.com/surveys/64/results/1563>)

Where is it likely that biologically relevant exposure may occur to CARBON NANOTUBES as they were manufactured?

Life cycle / Sector of use	Manufacture	Professional use	Consumer use	End of life/environmental	Check all	Not applicable	Total
Food additives/packaging	14.41% 17	4.24% 5	6.78% 8	5.93% 7	7.63% 9	22.88% 27	118
Construction	33.90% 40	17.80% 21	5.08% 6	16.95% 20	8.47% 10	2.54% 3	118
Agriculture	12.71% 15	11.02% 13	4.24% 5	7.63% 9	6.78% 8	21.19% 25	118
Advanced composites	37.29% 44	16.10% 19	5.08% 6	17.80% 21	9.32% 11	0.85% 1	118
Electronics/optics	36.44% 43	6.78% 8	2.54% 3	16.95% 20	6.78% 8	2.54% 3	118
Medical	15.25% 18	7.63% 9	12.71% 15	6.78% 8	5.08% 6	17.80% 21	118

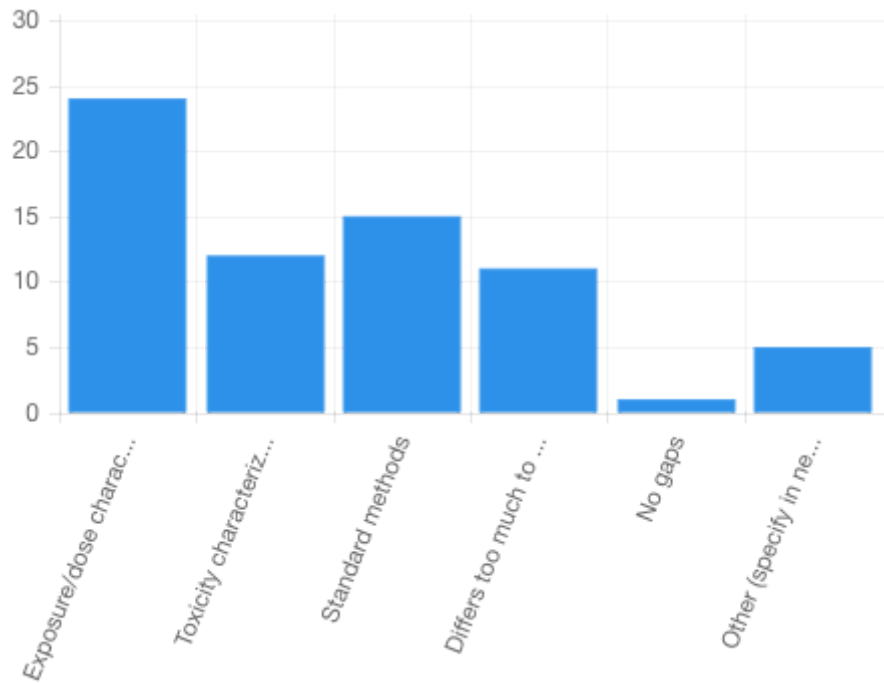
ID #1564 (<https://scipinion.com/surveys/64/results/1564>)

Check the boxes to indicate where you are confident that risk management for CARBON NANOTUBES can be supported with current methods.

Life Cycle Stage / Sector of Use	Manufacture	Professional use	Consumer use	End of life / environmental	Check all as confident	Not applicable	Total
Food additives/packaging	11.02% 13	10.17% 12	6.78% 8	4.24% 5	2.54% 3	23.73% 28	118
Construction	23.73% 28	15.25% 18	8.47% 10	5.08% 6	5.93% 7	7.63% 9	118
Agriculture	11.86% 14	8.47% 10	5.08% 6	5.08% 6	4.24% 5	19.49% 23	118
Advanced composites	27.12% 32	18.64% 22	9.32% 11	5.93% 7	6.78% 8	5.93% 7	118
Electronics/optics	27.12% 32	16.10% 19	7.63% 9	4.24% 5	5.93% 7	7.63% 9	118
Medical	9.32% 11	12.71% 15	8.47% 10	3.39% 4	3.39% 4	17.80% 21	118

ID #1565 (<https://scipinion.com/surveys/64/results/1565>)

What is the biggest gap in methods to support risk management for CARBON NANOTUBES?



Legend

answers: 68

skips: 50

ID #1566 (<https://scipinion.com/surveys/64/results/1566>)

Please give a short (one or two words if possible) response to clarify your choice of other above.

The diameter and length range of CNT is huge and the associated propagation / toxicology path changes completely and in various ways within those parameter ranges.

If the OECD methods are applied for toxicity testing and if the rules to control exposure taking into account the NOEL values, then there is no need for new methods. Why do you want to complicate things. I am convince that if every body is applying the existing rules, teverything will be Under control. But the existing rules are not always applied.

I think we are far to have adequate methods for CNT toxicity evaluation, fate determination, etcetera

different types of CNT with different toxicity, needs grouping

Depends on the situation (use and life cycle stage)

methods for measurment of CNTs in complex media needed

Professional co-responsibility along all the value chain is needed, especially to address with real impact the end of the value chain : consumer and environment.

agglomeration at unrealistic doses

exposure characterization - toxicity characterization

Data variability, measurement instrument performance

Large gaps in multiple locations

don't know

Dosage

Carbon nanotubes have a large variety of different lengths and diameters which can affect their toxicity.

I only expect CNTs to be used in advanced composites and electronics/optics. No other application areas are warranted based on CNT costs and similarity to asbestos with respect to low degradation rates in the environment. Furthermore, no CNTs are used as manufactured; they are all functionalized to work in various applications.

long-term studies carcinogenic risk

detection on consumer-products level seems not yet standardized

Maximum Exposures doses are not available because there is no validated method for it

at which degree of flexibility loses a WHO fibre an asbestos-like action

Impacts on health and environment depend of many parameters: length, diameter, structural defects, chemical functionalization, impurities, formulation, etc...So we need to improve physical, chemical and biologicals characterization tools using standards protocols.

there is not established technique for routine sensitive measurements of nanoparticles

risk assessment is not limited to biologically relevant

Insufficient characterisation of materials prior to testing; produces test results that lack the level of comparability required for informing an overall risk assessment.

No 'real-world' applicable testing methods

The specific toxicity of CNTs have to be clarified? Which are the causing parameters? Length and rigidity? Once that has been clarified safe use of this versatile material becomes possible if accompanied by good information policy!!

CNT toxicity is enormously dependent on physchem characteristics which can vary depending on type of CNT used, the nature of its release and any modifications that have occur leading up to its release (e.g. partially attached to a composite fragment). Once you know the exposure/ dose characteristics, you can't start to make informed conclusions about toxicity and risk.

There are currently conflicting evidences that show the level of toxicity of carbon nanotubes.

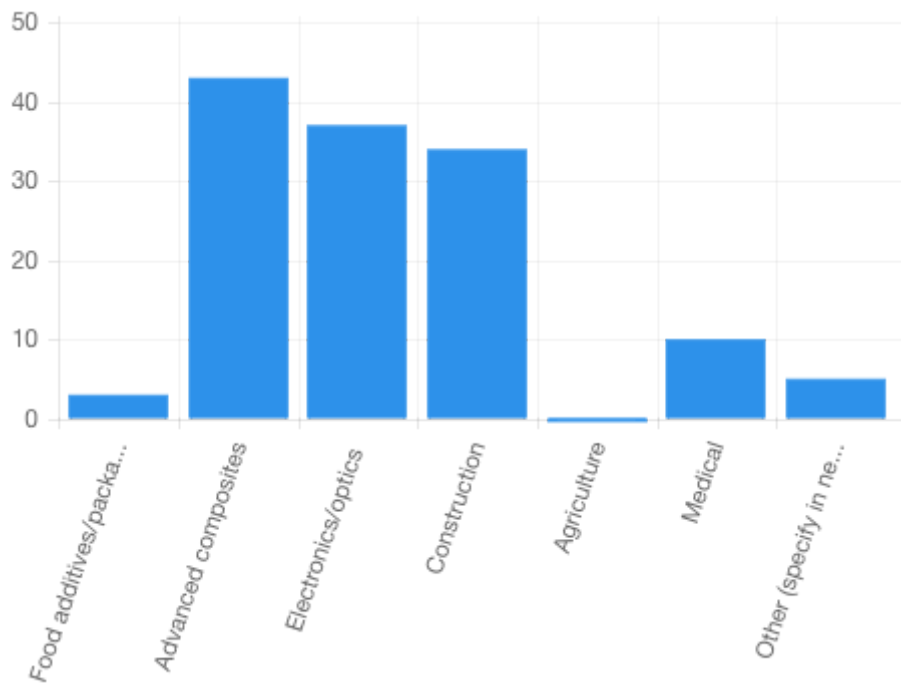
ID #1567 (<https://scipinion.com/surveys/64/results/1567>)

Where is the best point to control risk for CARBON NANOTUBE uses?

Sector of use / Risk control point	MNM design	Design of use	Controls during use	Monitoring exposures	Risk communication	Not applicable	Total
Food additives and packaging	14.75% 9	19.67% 12	13.11% 8	9.84% 6	3.28% 2	39.34% 24	61
Construction	21.31% 13	22.95% 14	24.59% 15	16.39% 10	11.48% 7	3.28% 2	61
Agriculture	16.95% 10	10.17% 6	18.64% 11	15.25% 9	6.78% 4	32.20% 19	59
Advanced composites	25.76% 17	25.76% 17	18.18% 12	22.73% 15	7.58% 5	0.00% 0	66
Electronics/optics/solar	22.22% 14	33.33% 21	14.29% 9	22.22% 14	6.35% 4	1.59% 1	63
Medical	18.97% 11	18.97% 11	13.79% 8	12.07% 7	12.07% 7	24.14% 14	58

ID #1568 (<https://scipinion.com/surveys/64/results/1568>)

Where will use at least double for CARBON NANOTUBES in the next 5-10 years?



Legend

answers: 65

skips: 53

ID #1569 (<https://scipinion.com/surveys/64/results/1569>)

If you selected the Other option above, please identify where you believe more than a doubling in use of CARBON NANOTUBES will occur in the next 5-10 years.

metal replacement by CNT polymer composites

personal care and cosmetics has not been mentioned but could be included in medical

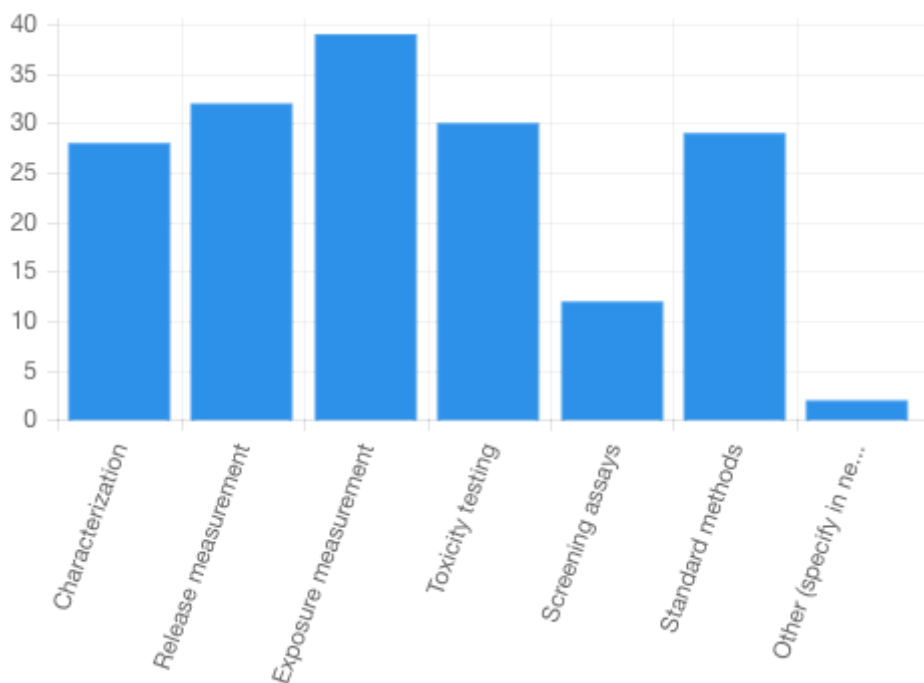
Don't know

not sure whether there will be really increasing market

Transportation, energy,

ID #1570 (<https://scipinion.com/surveys/64/results/1570>)

What developments will be most important in improving risk assessment for new uses of CARBON NANOTUBES? (Select no more than 3)



Legend

answers: 67

skips: 51

ID #1571 (<https://scipinion.com/surveys/64/results/1571>)

If you selected the Other option above, please identify what other developments you think will be most important in improving risk assessment for new uses of CARBON NANOTUBES in the next 5-10 years.

Keep it simple. The more complicated the approach the less effective it will be because it will not be applied

All choices are applicable - especially given the highly variable, dynamic nature of the types of CNTs and CNT-material composites that are entering commerce and the absence of standards or safety regulations.

a technique for routine ultrasensitive measurements of nanoparticles

ID #1572 (<https://scipinion.com/surveys/64/results/1572>)

Where will exposure to CARBON NANOTUBES change (per individual user or exposed population) in the next 5-10 years?

	Decrease	Same	Increase	Total
Food additives/packaging	1.72% 1	72.41% 42	25.86% 15	58
Advanced composites	3.08% 2	15.38% 10	81.54% 53	65
Electronics/optics	1.59% 1	22.22% 14	76.19% 48	63
Construction	1.72% 1	24.14% 14	74.14% 43	58
Agriculture	3.57% 2	75.00% 42	21.43% 12	56
Medical	3.39% 2	54.24% 32	42.37% 25	59

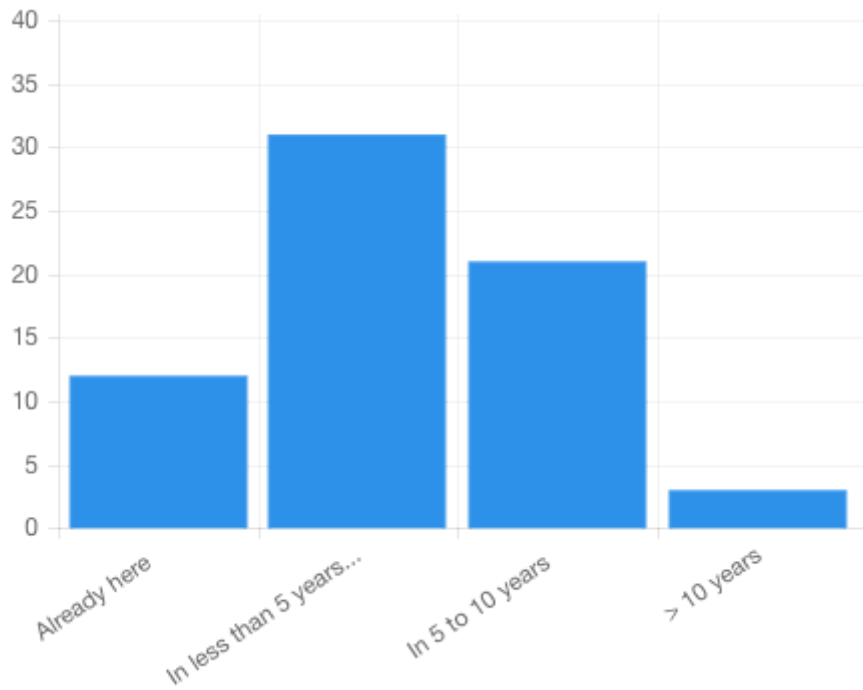
ID #1573 (<https://scipinion.com/surveys/64/results/1573>)

WHEN do you believe EXPOSURE ASSESSMENT METHODS for CARBON NANOTUBES will be adequate to make decisions on risk management?

Life cycle stage	Already here	In less than 5 years	In 5 to 10 years	> 10 years	Total
Manufacture	31.25% 20	45.31% 29	21.88% 14	1.56% 1	64
Professional use	28.57% 18	34.92% 22	33.33% 21	3.17% 2	63
Consumer use	12.50% 8	31.25% 20	39.06% 25	17.19% 11	64
End of life/environmental	7.94% 5	26.98% 17	26.98% 17	38.10% 24	63

ID #1620 (<https://scipinion.com/surveys/64/results/1620>)

WHEN do you believe TOXICITY ASSESSMENT METHODS for CARBON NANOTUBES will be adequate to make decisions on risk management?



Legend

answers: 67

skips: 51

ID #1619 (<https://scipinion.com/surveys/64/results/1619>)

Thanks for completing the questions for CARBON NANOTUBES. You can now either click on the tab to the left or continue on to SILICON DIOXIDE by clicking next.

		Total
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SECTION: - SILICON DIOXIDEID #1588 (<https://scipinion.com/surveys/64/results/1588>)

For each sector of use, which life cycle stage has the highest exposure potential for manufactured nanoscale SILICON DIOXIDE.

Life cycle/ Sector of use	Manufacture	Professional use	Consumer use	End of life / environmental	Not applicable	Total
Food additives/packaging	21.95% 9	4.88% 2	53.66% 22	12.20% 5	7.32% 3	41
Construction	42.50% 17	32.50% 13	2.50% 1	10.00% 4	12.50% 5	40
Agriculture	18.42% 7	21.05% 8	2.63% 1	26.32% 10	31.58% 12	38
Advanced composites	50.00% 19	15.79% 6	10.53% 4	21.05% 8	2.63% 1	38
Electronics / optics	55.00% 22	17.50% 7	2.50% 1	17.50% 7	7.50% 3	40
Medical	25.00% 9	8.33% 3	50.00% 18	5.56% 2	11.11% 4	36

ID #1589 (<https://scipinion.com/surveys/64/results/1589>)

Where is it likely that biologically relevant exposure may occur to nanoscale SILICON DIOXIDE as it was manufactured.

Life cycle / Sector of use	Manufacture	Professional use	Consumer use	End of life/environmental	Check all	Not applicable	Total
Food additives/packaging	15.25% 18	6.78% 8	16.95% 20	7.63% 9	3.39% 4	3.39% 4	118
Construction	17.80% 21	15.25% 18	3.39% 4	10.17% 12	2.54% 3	4.24% 5	118
Agriculture	10.17% 12	6.78% 8	3.39% 4	9.32% 11	1.69% 2	10.17% 12	118
Advanced composites	15.25% 18	9.32% 11	1.69% 2	5.93% 7	1.69% 2	2.54% 3	118
Electronics/optics	16.95% 20	5.93% 7	0.00% 0	8.47% 10	1.69% 2	3.39% 4	118
Medical	12.71% 15	8.47% 10	11.02% 13	5.08% 6	1.69% 2	5.93% 7	118

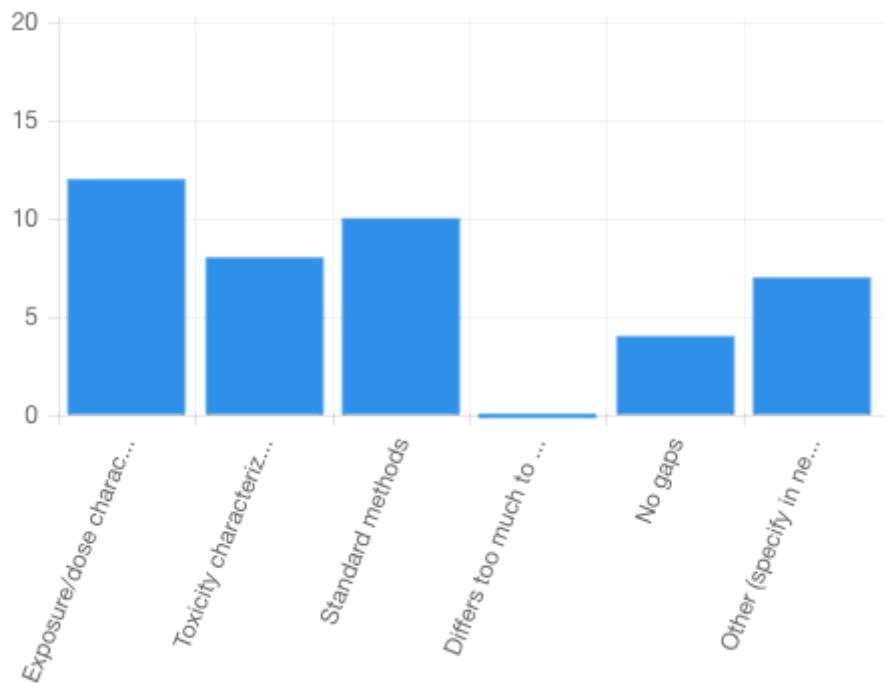
ID #1590 (<https://scipinion.com/surveys/64/results/1590>)

Check the boxes to indicate where you are confident that risk management for nanoscale SILICON DIOXIDE can be supported with current methods.

Life cycle / Sector of use	Manufacture	Professional use	Consumer use	End of life / environmental	Check all as confident	Not applicable	Total
Food additives/packaging	13.56% 16	8.47% 10	5.08% 6	2.54% 3	10.17% 12	5.08% 6	118
Construction	11.02% 13	5.93% 7	2.54% 3	1.69% 2	9.32% 11	5.93% 7	118
Agriculture	8.47% 10	4.24% 5	4.24% 5	1.69% 2	5.93% 7	11.02% 13	118
Advanced composites	9.32% 11	5.93% 7	5.08% 6	2.54% 3	9.32% 11	4.24% 5	118
Electronics/optics	11.86% 14	8.47% 10	4.24% 5	1.69% 2	9.32% 11	5.08% 6	118
Medical	6.78% 8	4.24% 5	4.24% 5	0.85% 1	10.17% 12	8.47% 10	118

ID #1591 (<https://scipinion.com/surveys/64/results/1591>)

What is the biggest gap in methods to support risk management for nanoscale SILICON DIOXIDE?



Legend

answers: 41

skips: 77

ID #1592 (<https://scipinion.com/surveys/64/results/1592>)

Please give a short (one or two words if possible) response to clarify your choice of other above.

Much depends on complexities of commercialized nano structures and their applications. Similar scale gaps exist across the board for many different nano silicon substances.

Silicon dioxide is quite abundant in the nature and in equipment and its quantification is complicated.

differences/tox effects related to surface modifications of silica

lack of relevant studies

Depends on the situation (use and life cycle stage)

agglomeration at unrealistic doses

I have no knowledge of silicon dioxide nano uses

Data variability, instrument performance

don't know

I expect nano-SiO₂ in food, composites and electronic applications. In general, these will be coated materials and not 'as manufactured'. I rate many of these questions as non-applicable for this reason.

cross-toxicities effects are under-documented (carrier effects, toxic synergies)

long-term studies carcinogenic risk

How to deal in risk assessment with different forms of silicon dioxide. For example, a toxicity study may be available for one form, but it is unknown if this information is also applicable for other forms.

lack of knowledge about potential risk of cumulation of nano-Si after use

Always needs of repeatable, reproducible standard methods to support risk management

Old material; many uses; toxicologists need to decide if their current tests need modification

valid analytical tools to determine particles in toxicologically relevant matrices

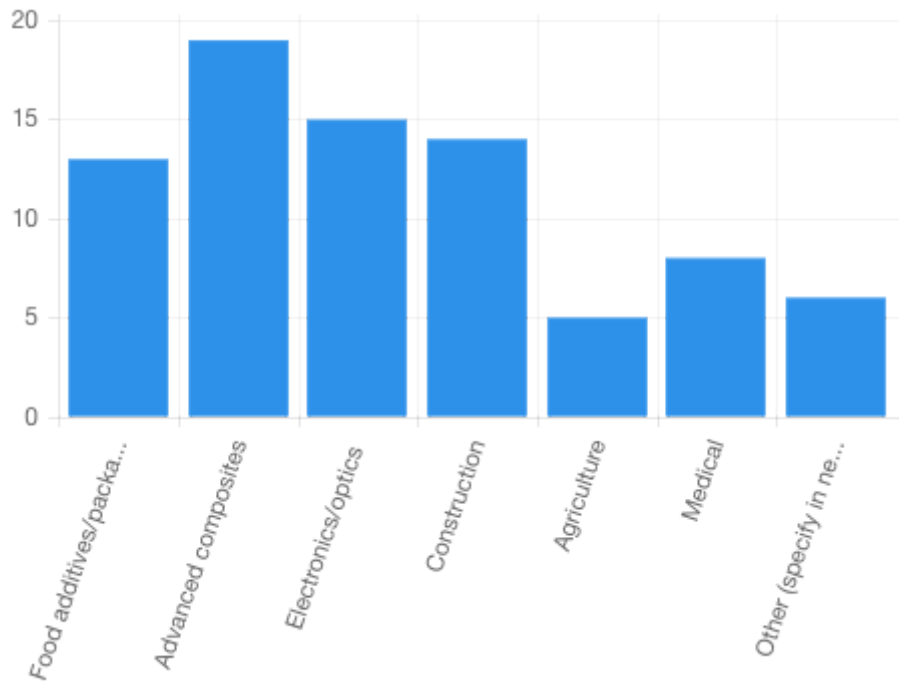
ID #1593 (<https://scipinion.com/surveys/64/results/1593>)

Where is the best point to control risk for nanoscale SILICON DIOXIDE uses?

Sector of use / Risk control point	MNM design	Design of use	Controls during use	Monitoring exposures	Risk communication	Not applicable	Total
Food additives/packaging	20.00% 8	35.00% 14	20.00% 8	10.00% 4	10.00% 4	5.00% 2	40
Construction	17.95% 7	23.08% 9	30.77% 12	10.26% 4	10.26% 4	7.69% 3	39
Agriculture	21.05% 8	18.42% 7	18.42% 7	10.53% 4	7.89% 3	23.68% 9	38
Advanced composites	23.68% 9	23.68% 9	26.32% 10	7.89% 3	15.79% 6	2.63% 1	38
Electronics/optics	25.64% 10	23.08% 9	25.64% 10	7.69% 3	15.38% 6	2.56% 1	39
Medical	29.73% 11	16.22% 6	16.22% 6	10.81% 4	10.81% 4	16.22% 6	37

ID #1594 (<https://scipinion.com/surveys/64/results/1594>)

Where will use at least double for nanoscale SILICON DIOXIDE in the next 5-10 years?



Legend

answers: 38

skips: 80

ID #1595 (<https://scipinion.com/surveys/64/results/1595>)

If you selected the Other option above, please identify where you believe more than a doubling in use of nanoscale SILICON DIOXIDE will occur in the next 5-10 years.

personal care is likely to be an important category

I have no knowledge of silicon dioxide nano uses

As SiO₂ is in use on the scale of thousand of tons there is no real further increase expected

will not dramatically change

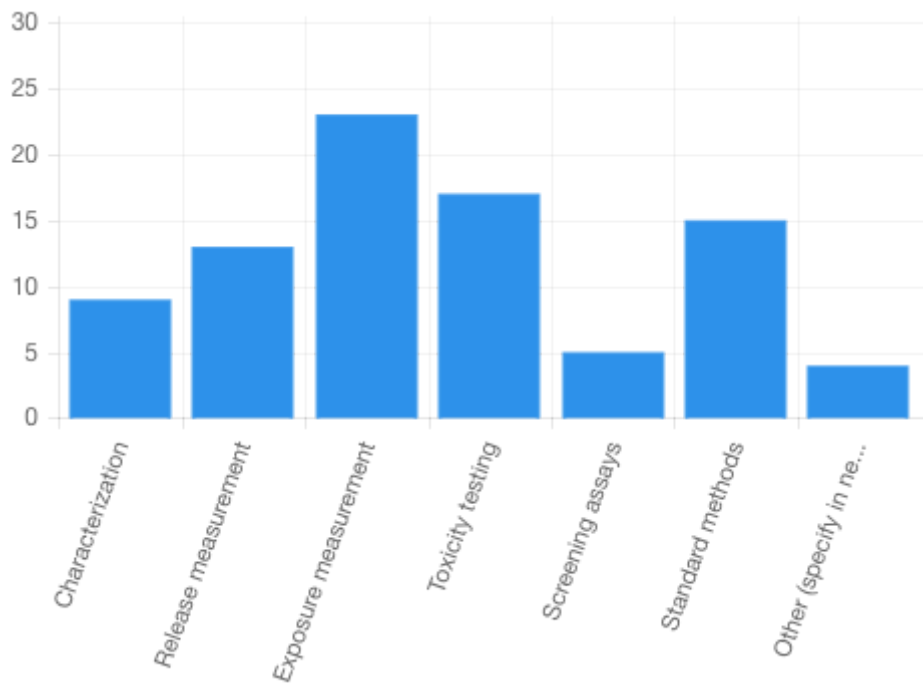
Transportation (Tyres)

Flame retardants , Catalysis

Production volumes are already large

ID #1596 (<https://scipinion.com/surveys/64/results/1596>)

What developments will be most important in improving risk assessment for new uses of nanoscale SILICON DIOXIDE? (Select no more than 3)



Legend

answers: 41

skips: 77

ID #1597 (<https://scipinion.com/surveys/64/results/1597>)

If you selected the Other option above, please identify what other developments you think will be most important in improving risk assessment for new uses of nanoscale SILICON DIOXIDE in the next 5-10 years.

I have no knowledge of silicon dioxide nano uses

See answer to question 5, and suitable toxicity testing for the most potent/relevant form of silicon dioxide.

long term cumulation studies; real life monitoring

already there

ID #1598 (<https://scipinion.com/surveys/64/results/1598>)

Where will exposure to nanoscale SILICON DIOXIDE change (per individual user or exposed population) in the next 5-10 years?

	Decrease	Same	Increase	Total
Food additives/packaging	5.56% 2	47.22% 17	47.22% 17	36
Advanced composites	0.00% 0	41.18% 14	58.82% 20	34
Electronics/optics	2.78% 1	55.56% 20	41.67% 15	36
Construction	0.00% 0	41.18% 14	58.82% 20	34
Agriculture	2.86% 1	74.29% 26	22.86% 8	35
Medical	2.94% 1	73.53% 25	23.53% 8	34

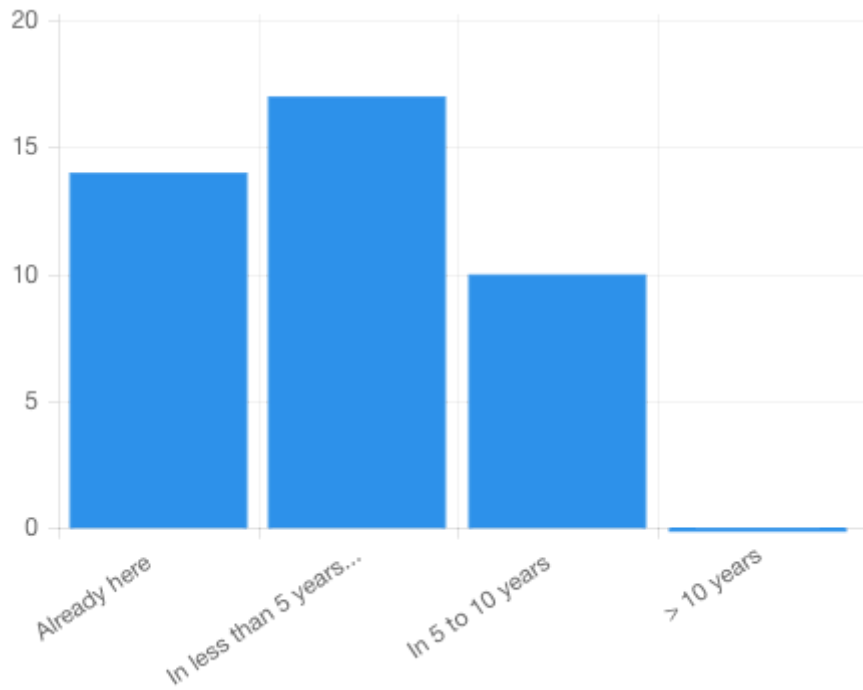
ID #1599 (<https://scipinion.com/surveys/64/results/1599>)

WHEN do you believe EXPOSURE ASSESSMENT METHODS for nanoscale SILICON DIOXIDE will be adequate to make decisions on risk management?

Life cycle stage	Already here	In less than 5 years	In 5 to 10 years	> 10 years	Total
Manufacture	50.00% 20	35.00% 14	15.00% 6	0.00% 0	40
Professional use	41.03% 16	41.03% 16	17.95% 7	0.00% 0	39
Consumer use	25.00% 10	57.50% 23	12.50% 5	5.00% 2	40
End of life/environmental	19.44% 7	36.11% 13	27.78% 10	16.67% 6	36

ID #1621 (<https://scipinion.com/surveys/64/results/1621>)

WHEN do you believe TOXICITY ASSESSMENT METHODS for nanoscale SILICON DIOXIDE will be adequate to make decisions on risk management?



Legend

answers: 41

skips: 77

ID #1667 (<https://scipinion.com/surveys/64/results/1667>)

Thanks for completing the questions for SILICON DIOXIDE. You can now either click on the tab to the left or continue on to BARIUM SULPHATE by clicking next.

		Total
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SECTION: - BARIUM SULPHATEID #1625 (<https://scipinion.com/surveys/64/results/1625>)

For each sector of use, which life cycle stage has the highest exposure potential for manufactured nanoscale BARIUM SULPHATE.

Life cycle/ Sector of use	Manufacture	Professional use	Consumer use	End of life / environmental	Not applicable	Total
Food additives/packaging	25.00% 5	0.00% 0	5.00% 1	15.00% 3	55.00% 11	20
Construction	22.22% 4	11.11% 2	0.00% 0	22.22% 4	44.44% 8	18
Agriculture	20.00% 4	15.00% 3	0.00% 0	20.00% 4	45.00% 9	20
Advanced composites	27.78% 5	5.56% 1	5.56% 1	22.22% 4	38.89% 7	18
Electronics / optics	27.78% 5	5.56% 1	0.00% 0	22.22% 4	44.44% 8	18
Medical	11.76% 2	0.00% 0	52.94% 9	11.76% 2	23.53% 4	17

ID #1626 (<https://scipinion.com/surveys/64/results/1626>)

Where is it likely that biologically relevant exposure may occur to nanoscale BARIUM SULPHATE as it was manufactured.

Life cycle / Sector of use	Manufacture	Professional use	Consumer use	End of life/environmental	Check all	Not applicable	Total
Food additives/packaging	5.93% 7	1.69% 2	0.85% 1	3.39% 4	0.00% 0	7.63% 9	118
Construction	5.08% 6	4.24% 5	0.85% 1	3.39% 4	0.00% 0	5.93% 7	118
Agriculture	5.93% 7	3.39% 4	1.69% 2	4.24% 5	0.00% 0	6.78% 8	118
Advanced composites	5.08% 6	1.69% 2	0.85% 1	2.54% 3	0.00% 0	6.78% 8	118
Electronics/optics	5.08% 6	0.85% 1	0.00% 0	2.54% 3	0.00% 0	5.93% 7	118
Medical	5.08% 6	3.39% 4	6.78% 8	2.54% 3	0.85% 1	2.54% 3	118

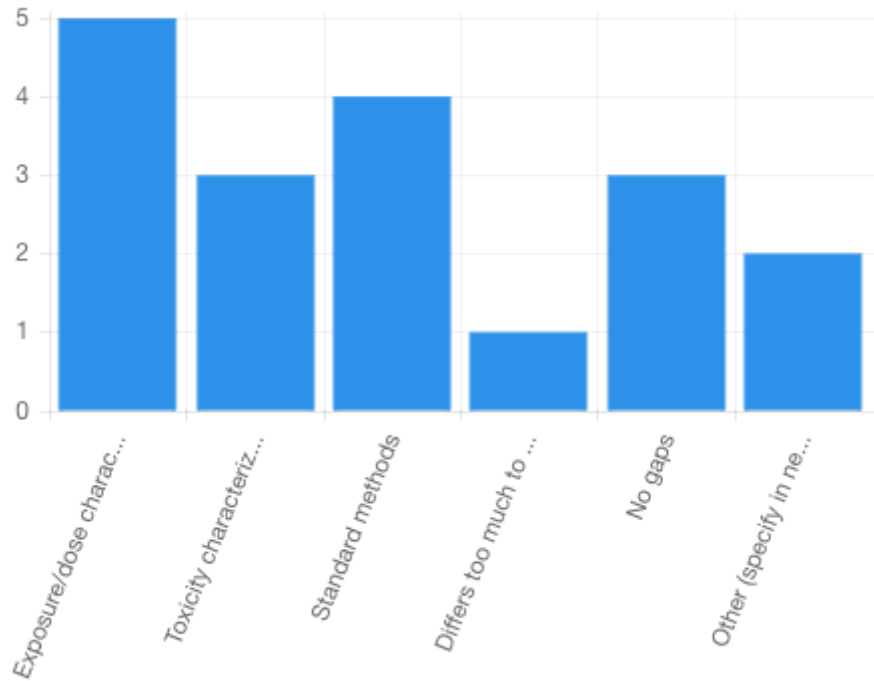
ID #1627 (<https://scipinion.com/surveys/64/results/1627>)

Check the boxes to indicate where you are confident that risk management for nanoscale BARIUM SULPHATE can be supported with current methods.

Life Cycle Stage / Sector of Use	Manufacture	Professional use	Consumer use	End of life / environmental	Check all as confident	Not applicable	Total
Food additives/packaging	2.54% 3	2.54% 3	0.85% 1	1.69% 2	5.08% 6	5.08% 6	118
Construction	1.69% 2	0.85% 1	1.69% 2	1.69% 2	5.93% 7	4.24% 5	118
Agriculture	2.54% 3	0.00% 0	0.00% 0	0.85% 1	5.08% 6	5.93% 7	118
Advanced composites	1.69% 2	1.69% 2	2.54% 3	1.69% 2	5.93% 7	4.24% 5	118
Electronics/optics	2.54% 3	2.54% 3	2.54% 3	1.69% 2	5.08% 6	5.08% 6	118
Medical	2.54% 3	2.54% 3	4.24% 5	0.85% 1	7.63% 9	1.69% 2	118

ID #1628 (<https://scipinion.com/surveys/64/results/1628>)

What is the biggest gap in methods to support risk management for nanoscale BARIUM SULPHATE?



Legend

answers: 18

skips: 100

ID #1629 (<https://scipinion.com/surveys/64/results/1629>)

Please give a short (one or two words if possible) response to clarify your choice of other above.

agglomeration at unrealistic doses

I have no knowledge of barium sulphate nano uses

long-term studies carcinogenic risk

no high toxicity no really relevant data gaps

Always needs of repeatable and reproducible protocols

dose is everything

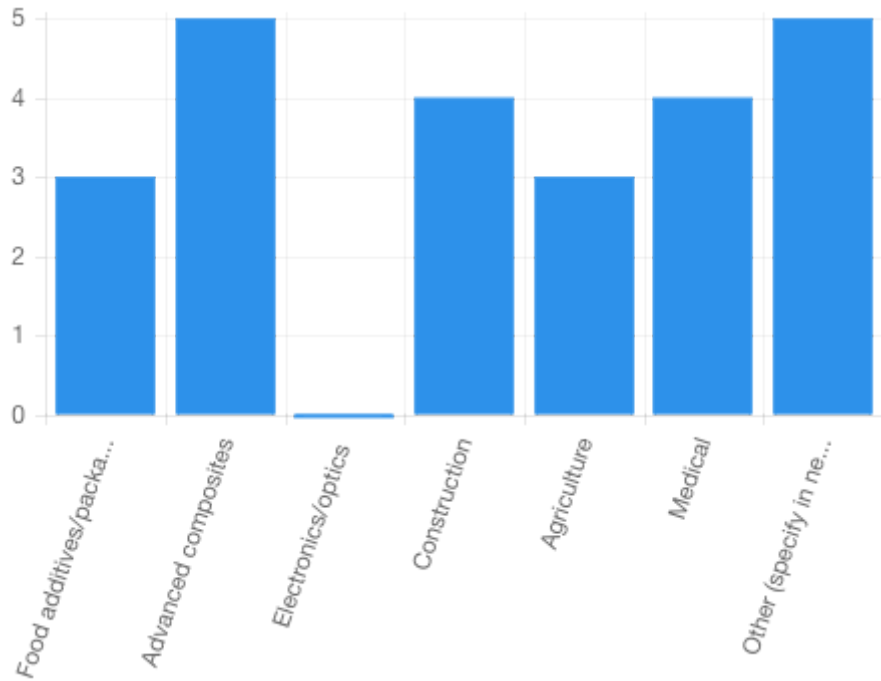
ID #1630 (<https://scipinion.com/surveys/64/results/1630>)

Where is the best point to control risk for nanoscale BARIUM SULPHATE uses?

Sector of use / Risk control point	MNM design	Design of use	Controls during use	Monitoring exposures	Risk communication	Not applicable	Total
Food additives/packaging	5.56% 1	16.67% 3	16.67% 3	11.11% 2	5.56% 1	44.44% 8	18
Construction	0.00% 0	23.53% 4	23.53% 4	5.88% 1	11.76% 2	35.29% 6	17
Agriculture	0.00% 0	27.78% 5	16.67% 3	5.56% 1	11.11% 2	38.89% 7	18
Advanced composites	0.00% 0	23.53% 4	17.65% 3	11.76% 2	11.76% 2	35.29% 6	17
Electronics/optics	0.00% 0	29.41% 5	11.76% 2	11.76% 2	11.76% 2	35.29% 6	17
Medical	5.88% 1	23.53% 4	23.53% 4	5.88% 1	17.65% 3	23.53% 4	17

ID #1631 (<https://scipinion.com/surveys/64/results/1631>)

Where will use at least double for nanoscale BARIUM SULPHATE in the next 5-10 years?



Legend

answers: 16

skips: 102

ID #1632 (<https://scipinion.com/surveys/64/results/1632>)

If you selected the Other option above, please identify where you believe more than a doubling in use of nanoscale BARIUM SULPHATE will occur in the next 5-10 years.

none predominante use is as a positive control in inhalation studies.

none predominante use is as a positive control in inhalation studies.

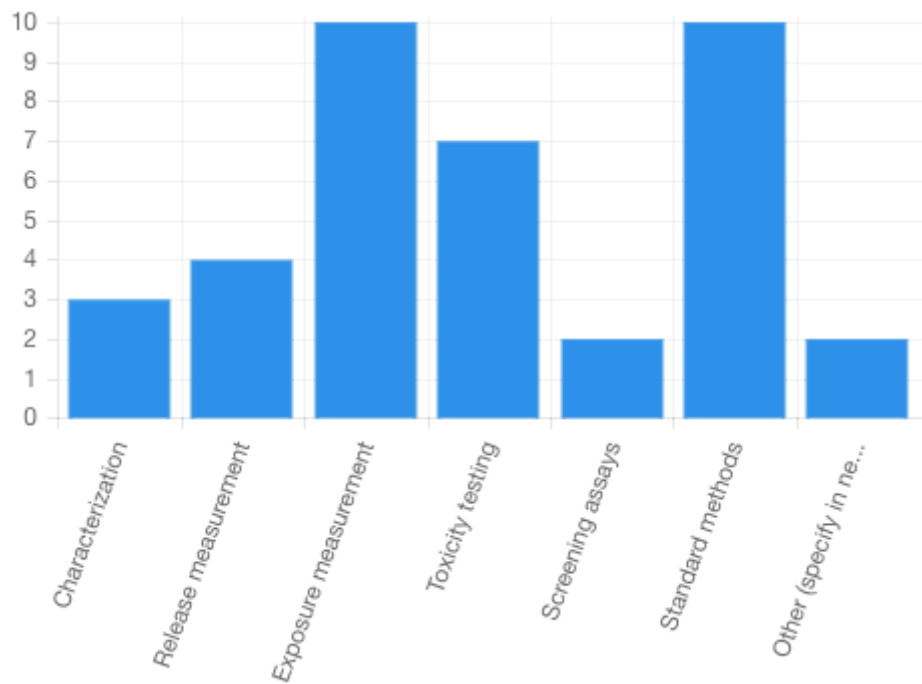
I have no knowledge of barium sulphate nano uses

I do not expect any increasing use of BaSO₄

no change

ID #1633 (<https://scipinion.com/surveys/64/results/1633>)

What developments will be most important in improving risk assessment for new uses of nanoscale BARIUM SULPHATE? (Select no more than 3)



Legend

answers: 18

skips: 100

ID #1634 (<https://scipinion.com/surveys/64/results/1634>)

If you selected the Other option above, please identify what other developments you think will be most important in improving risk assessment for new uses of nanoscale BARIUM SULPHATE in the next 5-10 years.

I have no knowledge of barium sulphate nano uses

none

ID #1635 (<https://scipinion.com/surveys/64/results/1635>)

Where will exposure to nanoscale BARIUM SULPHATE change (per individual user or exposed population) in the next 5-10 years?

	Decrease	Same	Increase	Total
Food additives/packaging	6.25% 1	68.75% 11	25.00% 4	16
Advanced composites	0.00% 0	62.50% 10	37.50% 6	16
Electronics/optics	0.00% 0	81.25% 13	18.75% 3	16
Construction	0.00% 0	62.50% 10	37.50% 6	16
Agriculture	5.88% 1	76.47% 13	17.65% 3	17
Medical	0.00% 0	68.75% 11	31.25% 5	16

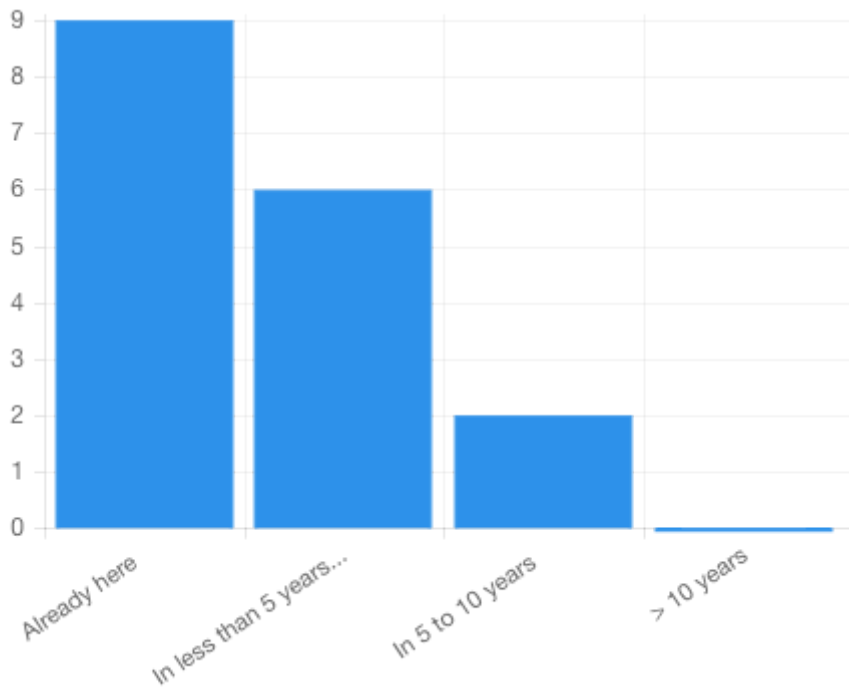
ID #1636 (<https://scipinion.com/surveys/64/results/1636>)

WHEN do you believe EXPOSURE ASSESSMENT METHODS for nanoscale BARIUM SULPHATE will be adequate to make decisions on risk management?

Life cycle stage	Already here	In less than 5 years	In 5 to 10 years	> 10 years	Total
Manufacture	68.75% 11	31.25% 5	0.00% 0	0.00% 0	16
Professional use	56.25% 9	43.75% 7	0.00% 0	0.00% 0	16
Consumer use	56.25% 9	37.50% 6	6.25% 1	0.00% 0	16
End of life/environmental	40.00% 6	26.67% 4	26.67% 4	6.67% 1	15

ID #1637 (<https://scipinion.com/surveys/64/results/1637>)

WHEN do you believe TOXICITY ASSESSMENT METHODS for nanoscale BARIUM SULPHATE will be adequate to make decisions on risk management?



Legend

answers: 17

skips: 101

ID #1668 (<https://scipinion.com/surveys/64/results/1668>)

Thanks for completing the questions for BARIUM SULPHATE. You can now either click on the tab to the left or continue on to CERIUM OXIDE by clicking next.

		Total
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SECTION: - CERIUM OXIDEID #1653 (<https://scipinion.com/surveys/64/results/1653>)

For each sector of use, which life cycle stage has the highest exposure potential for manufactured nanoscale CERIUM OXIDE?

Life cycle/ Sector of use	Manufacture	Professional use	Consumer use	End of life / environmental	Not applicable	Total
Food additives/packaging	25.00% 7	3.57% 1	14.29% 4	7.14% 2	50.00% 14	28
Construction	25.00% 7	32.14% 9	7.14% 2	7.14% 2	28.57% 8	28
Agriculture	19.23% 5	3.85% 1	3.85% 1	23.08% 6	50.00% 13	26
Advanced composites	33.33% 9	18.52% 5	18.52% 5	11.11% 3	18.52% 5	27
Electronics / optics	40.74% 11	18.52% 5	3.70% 1	22.22% 6	14.81% 4	27
Medical	28.57% 8	3.57% 1	28.57% 8	3.57% 1	35.71% 10	28

ID #1654 (<https://scipinion.com/surveys/64/results/1654>)

Where is it likely that biologically relevant exposure may occur to nanoscale CERIUM OXIDE as it was manufactured?

Life cycle / Sector of use	Manufacture	Professional use	Consumer use	End of life/environmental	Check all	Not applicable	Total
Food additives/packaging	7.63% 9	1.69% 2	1.69% 2	4.24% 5	0.85% 1	11.86% 14	118
Construction	8.47% 10	5.93% 7	3.39% 4	3.39% 4	1.69% 2	8.47% 10	118
Agriculture	5.08% 6	4.24% 5	1.69% 2	2.54% 3	0.85% 1	13.56% 16	118
Advanced composites	11.86% 14	5.08% 6	3.39% 4	3.39% 4	0.00% 0	7.63% 9	118
Electronics/optics	10.17% 12	6.78% 8	0.85% 1	5.93% 7	1.69% 2	5.93% 7	118
Medical	7.63% 9	2.54% 3	5.08% 6	2.54% 3	2.54% 3	8.47% 10	118

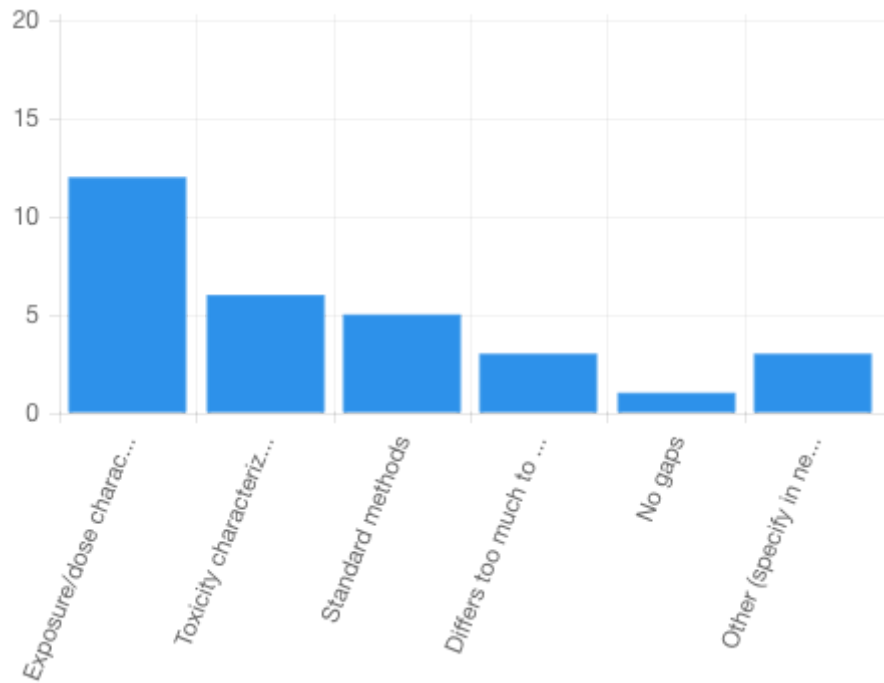
ID #1655 (<https://scipinion.com/surveys/64/results/1655>)

Check the boxes to indicate where you are confident that risk management for nanoscale CERIUM OXIDE can be supported with current methods.

Life Cycle Stage / Sector of Use	Manufacture	Professional use	Consumer use	End of life / environmental	Check all as confident	Not applicable	Total
Food additives/packaging	3.39% 4	2.54% 3	0.85% 1	0.85% 1	3.39% 4	13.56% 16	118
Construction	6.78% 8	3.39% 4	1.69% 2	1.69% 2	3.39% 4	10.17% 12	118
Agriculture	3.39% 4	1.69% 2	0.00% 0	0.85% 1	3.39% 4	12.71% 15	118
Advanced composites	5.93% 7	3.39% 4	0.85% 1	2.54% 3	3.39% 4	9.32% 11	118
Electronics/optics	7.63% 9	6.78% 8	2.54% 3	1.69% 2	4.24% 5	5.08% 6	118
Medical	4.24% 5	4.24% 5	3.39% 4	0.00% 0	4.24% 5	8.47% 10	118

ID #1656 (<https://scipinion.com/surveys/64/results/1656>)

What is the biggest gap in methods to support risk management for nanoscale CERIUM OXIDE?



Legend

answers: 30

skips: 88

ID #1657 (<https://scipinion.com/surveys/64/results/1657>)

Please give a short (one or two words if possible) response to clarify your choice of other above.

predominant use as fuel catalyst therefore airborne exposure due to exhaust is the rout to investigate other uses are minor and have no population impact

predominant use as fuel catalyst therefore airborne exposure due to exhaust is the rout to investigate other uses are minor and have no population impact

Natural Ce

Depends on the situation (use and life cycle stage)

agglomeration at unrealistic doses

I have no knowledge of cerium oxide nano uses

Extensive studies

Nanoceria has been shown to undergo biotransformations. Therefore, the responses to questions to 2 and 3 are non-applicable. As a rare earth, applications of nanoceria will need to have high value and low volume. Whereas, nanosilica use could be wide-spread due to its lower cost and high availability.

long-term studies carcinogenic risk

As before, needs of repeatable and reproducible protocols for dose and toxicity characterization,

some open questions.

dose is everything

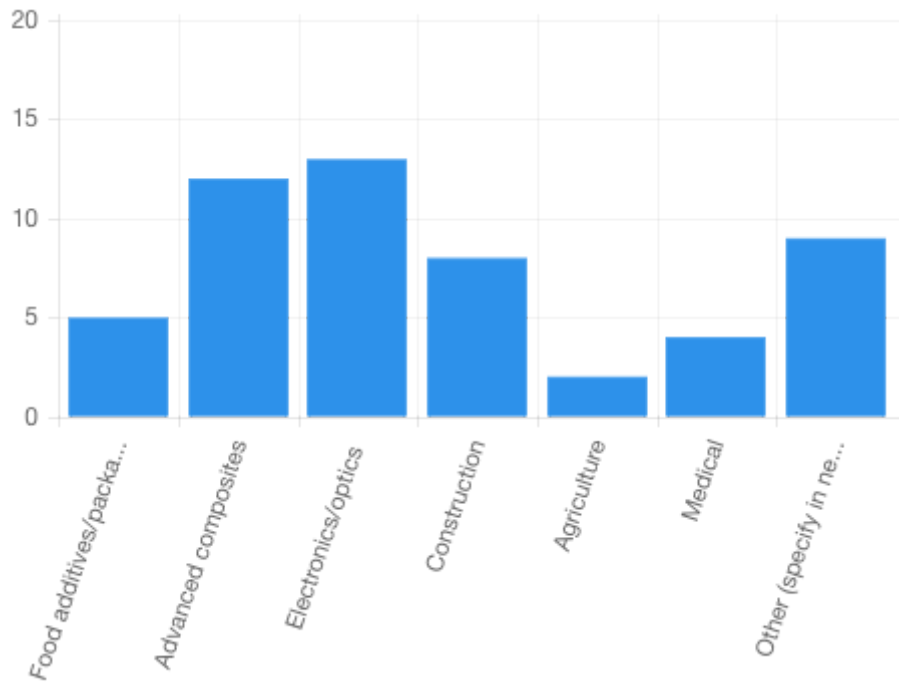
ID #1658 (<https://scipinion.com/surveys/64/results/1658>)

Where is the best point to control risk for nanoscale CERIUM OXIDE uses?

Sector of use / Risk control point	MNM design	Design of use	Controls during use	Monitoring exposures	Risk communication	Not applicable	Total
Food additives/packaging	3.85% 1	26.92% 7	11.54% 3	7.69% 2	7.69% 2	42.31% 11	26
Construction	11.11% 3	40.74% 11	14.81% 4	7.41% 2	7.41% 2	18.52% 5	27
Agriculture	8.00% 2	28.00% 7	16.00% 4	4.00% 1	8.00% 2	36.00% 9	25
Advanced composites	7.69% 2	34.62% 9	11.54% 3	7.69% 2	11.54% 3	26.92% 7	26
Electronics/optics	7.41% 2	33.33% 9	22.22% 6	11.11% 3	11.11% 3	14.81% 4	27
Medical	4.00% 1	24.00% 6	16.00% 4	16.00% 4	12.00% 3	28.00% 7	25

ID #1659 (<https://scipinion.com/surveys/64/results/1659>)

Where will use at least double for nanoscale CERIUM OXIDE in the next 5-10 years?



Legend

answers: 28

skips: 90

ID #1660 (<https://scipinion.com/surveys/64/results/1660>)

If you selected the Other option above, please identify where you believe more than a doubling in use of nanoscale CERIUM OXIDE will occur in the next 5-10 years.

fuel additive

fuel additive

You didn't mention energy/ fuel additives or personal care/cosmetics categories. These seem quite important

not sure it will double

I have no knowledge of cerium oxide nano uses

automotive

transportation (catalysis for automotives)

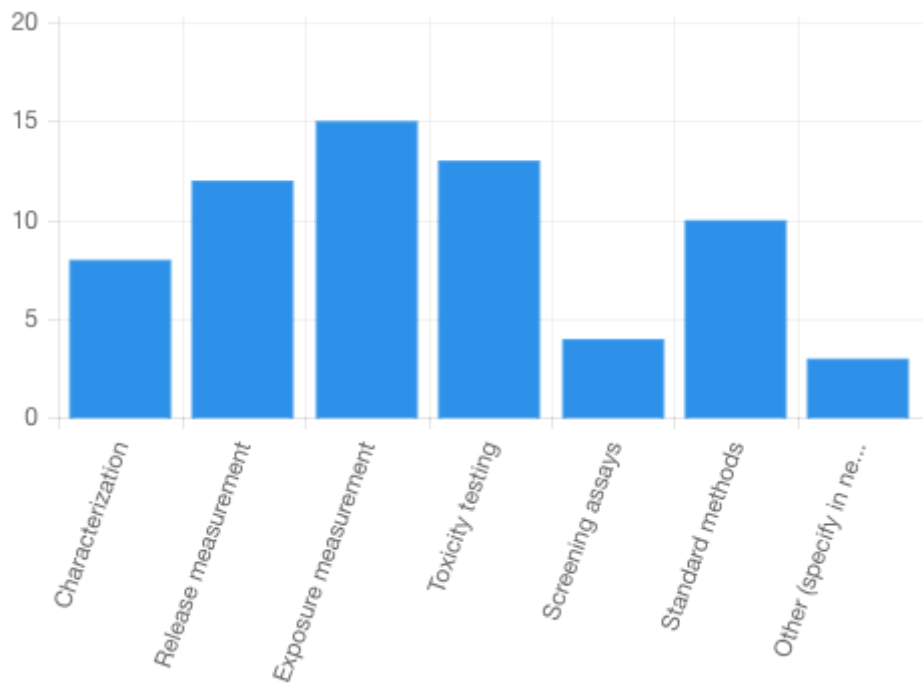
none

fuel additives

catalysis

ID #1661 (<https://scipinion.com/surveys/64/results/1661>)

What developments will be most important in improving risk assessment for new uses of nanoscale CERIUM OXIDE? (Select no more than 3)



Legend

answers: 30

skips: 88

ID #1662 (<https://scipinion.com/surveys/64/results/1662>)

If you selected the Other option above, please identify what other developments you think will be most important in improving risk assessment for new uses of nanoscale CERIUM OXIDE in the next 5-10 years.

same comment as for other nanomaterials

methods for differentiating from background Ce

I have no knowledge of cerium oxide nano uses

ID #1663 (<https://scipinion.com/surveys/64/results/1663>)

Where will exposure to nanoscale CERIUM OXIDE change (per individual user or exposed population) in the next 5-10 years?

	Decrease	Same	Increase	Total
Food additives/packaging	5.00% 1	65.00% 13	30.00% 6	20
Advanced composites	0.00% 0	42.86% 9	57.14% 12	21
Electronics/optics	0.00% 0	59.09% 13	40.91% 9	22
Construction	0.00% 0	54.17% 13	45.83% 11	24
Agriculture	5.00% 1	85.00% 17	10.00% 2	20
Medical	0.00% 0	66.67% 14	33.33% 7	21

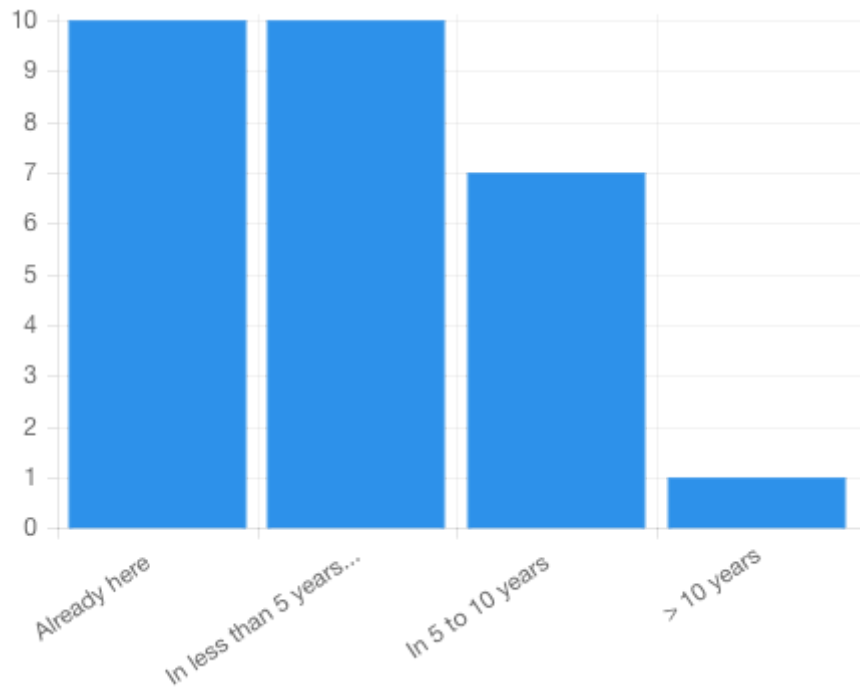
ID #1664 (<https://scipinion.com/surveys/64/results/1664>)

WHEN do you believe EXPOSURE ASSESSMENT METHODS for nanoscale CERIUM OXIDE will be adequate to make decisions on risk management?

Life cycle stage	Already here	In less than 5 years	In 5 to 10 years	> 10 years	Total
Manufacture	52.00% 13	40.00% 10	8.00% 2	0.00% 0	25
Professional use	40.00% 10	48.00% 12	12.00% 3	0.00% 0	25
Consumer use	25.00% 6	41.67% 10	25.00% 6	8.33% 2	24
End of life/environmental	8.33% 2	41.67% 10	33.33% 8	16.67% 4	24

ID #1665 (<https://scipinion.com/surveys/64/results/1665>)

WHEN do you believe TOXICITY ASSESSMENT METHODS for nanoscale CERIUM OXIDE will be adequate to make decisions on risk management?



Legend

answers: 28

skips: 90

ID #1669 (<https://scipinion.com/surveys/64/results/1669>)

Thanks for completing the questions for CERIUM OXIDE. You can now either click on the tab to the left or continue on to SILVER by clicking next.

		Total
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SECTION: - SILVERID #1639 (<https://scipinion.com/surveys/64/results/1639>)

For each sector of use, which life cycle stage has the highest exposure potential for manufactured nanoscale SILVER.

Life cycle/ Sector of use	Manufacture	Professional use	Consumer use	End of life / environmental	Not applicable	Total
Food additives/packaging	18.18% 12	6.06% 4	50.00% 33	21.21% 14	4.55% 3	66
Construction	18.97% 11	20.69% 12	10.34% 6	17.24% 10	32.76% 19	58
Agriculture	9.84% 6	29.51% 18	13.11% 8	26.23% 16	21.31% 13	61
Advanced composites	40.98% 25	11.48% 7	11.48% 7	24.59% 15	11.48% 7	61
Electronics / optics	41.67% 25	11.67% 7	6.67% 4	21.67% 13	18.33% 11	60
Medical	15.38% 10	16.92% 11	49.23% 32	10.77% 7	7.69% 5	65

ID #1640 (<https://scipinion.com/surveys/64/results/1640>)

Where is it likely that biologically relevant exposure may occur to nanoscale SILVER as it was manufactured.

Life cycle / Sector of use	Manufacture	Professional use	Consumer use	End of life/environmental	Check all	Not applicable	Total
Food additives/packaging	16.95% 20	7.63% 9	31.36% 37	18.64% 22	6.78% 8	2.54% 3	118
Construction	13.56% 16	11.02% 13	5.08% 6	14.41% 17	3.39% 4	16.10% 19	118
Agriculture	11.86% 14	17.80% 21	10.17% 12	21.19% 25	5.93% 7	9.32% 11	118
Advanced composites	21.19% 25	9.32% 11	10.17% 12	18.64% 22	5.93% 7	5.08% 6	118
Electronics/optics	21.19% 25	6.78% 8	5.93% 7	18.64% 22	4.24% 5	8.47% 10	118
Medical	16.95% 20	11.86% 14	27.12% 32	15.25% 18	7.63% 9	2.54% 3	118

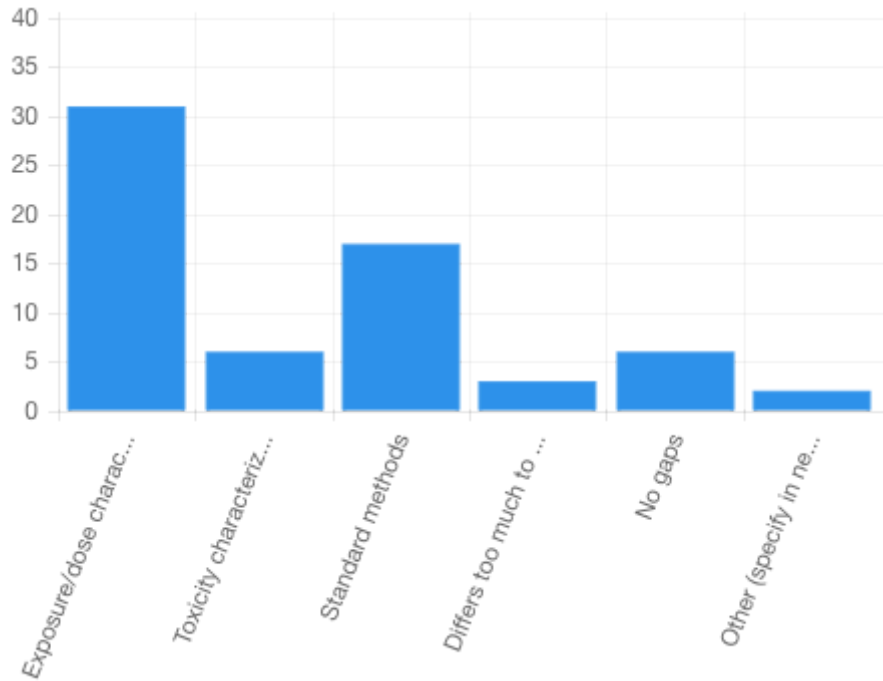
ID #1641 (<https://scipinion.com/surveys/64/results/1641>)

Check the boxes to indicate where you are confident that risk management for nanoscale SILVER can be supported with current methods.

Life Cycle Stage / Sector of Use	Manufacture	Professional use	Consumer use	End of life / environmental	Check all as confident	Not applicable	Total
Food additives/packaging	27.12% 32	16.10% 19	11.02% 13	5.08% 6	10.17% 12	4.24% 5	118
Construction	15.25% 18	8.47% 10	5.08% 6	2.54% 3	5.08% 6	16.10% 19	118
Agriculture	17.80% 21	10.17% 12	5.93% 7	5.08% 6	7.63% 9	12.71% 15	118
Advanced composites	22.03% 26	15.25% 18	8.47% 10	4.24% 5	8.47% 10	7.63% 9	118
Electronics/optics	20.34% 24	14.41% 17	7.63% 9	5.08% 6	9.32% 11	8.47% 10	118
Medical	22.03% 26	19.49% 23	12.71% 15	2.54% 3	10.17% 12	5.08% 6	118

ID #1642 (<https://scipinion.com/surveys/64/results/1642>)

What is the biggest gap in methods to support risk management for nanoscale SILVER?



Legend

answers: 65

skips: 53

ID #1643 (<https://scipinion.com/surveys/64/results/1643>)

Please give a short (one or two words if possible) response to clarify your choice of other above.

Exposure vs Transformation

No standards

what is the right metric?

agglomeration at unrealistic doses

I have no knowledge of nanoscale silver uses

techniques available but need to standardize

Data variability, instrument performance

I am missing application in textiles - a very likely exposure path

Despite the progress made to date in terms of understanding the biological/toxicological properties from first generation, pristine ENMs, there is still no systematic understanding of how ENM structure properties influence biological responses. More important, environmental and human exposure data are fragmentary and mostly for occupational settings, making it difficult for regulators to assess risks beyond the occupational level. Human exposure is not just limited to pristine ENMs during their synthesis and handling, but to a wide variety of particles released from NEPs across their life cycle, including consumer use of such aged and weathered materials and disposal.

nanosilver can dissolve in a number of biological relevant environments. It does not seem reasonable to expect wide-spread use, as we obviously do not have good control of it.

long-term studies carcinogenic risk

differentiation between ionic and nano-related risk

Repeatable and reproducible protocols

exposure of biologically active nanomaterial unclear

dose is everything

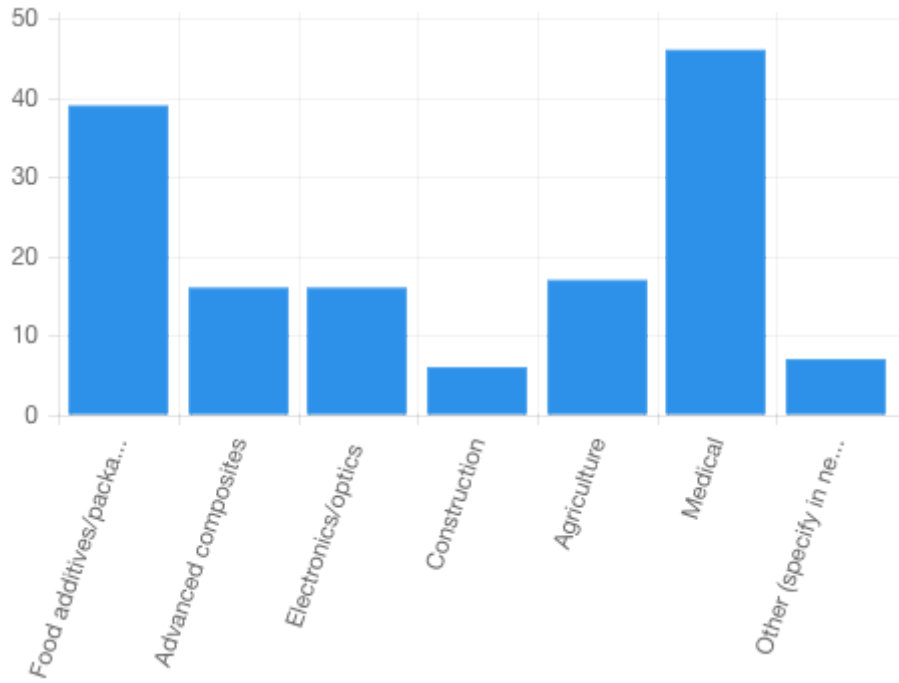
ID #1644 (<https://scipinion.com/surveys/64/results/1644>)

Where is the best point to control risk for nanoscale SILVER uses?

Sector of use / Risk control point	MNM design	Design of use	Controls during use	Monitoring exposures	Risk communication	Not applicable	Total
Food additives/packaging	26.15% 17	36.92% 24	13.85% 9	10.77% 7	9.23% 6	3.08% 2	65
Construction	10.17% 6	25.42% 15	13.56% 8	11.86% 7	11.86% 7	27.12% 16	59
Agriculture	14.52% 9	20.97% 13	19.35% 12	19.35% 12	8.06% 5	17.74% 11	62
Advanced composites	22.95% 14	24.59% 15	14.75% 9	18.03% 11	11.48% 7	8.20% 5	61
Electronics/optics	19.67% 12	32.79% 20	9.84% 6	13.11% 8	13.11% 8	11.48% 7	61
Medical	20.63% 13	30.16% 19	19.05% 12	15.87% 10	9.52% 6	4.76% 3	63

ID #1645 (<https://scipinion.com/surveys/64/results/1645>)

Where will use at least double for nanoscale SILVER in the next 5-10 years?



Legend

answers: 62

skips: 56

ID #1646 (<https://scipinion.com/surveys/64/results/1646>)

If you selected the Other option above, please identify where you believe more than a doubling in use of nanoscale SILVER will occur in the next 5-10 years.

I have no knowledge of nanoscale silver uses

textiles

Personal/health/cosmetics, clothing, and cross cutting

Personal hugien products, textiles, paints

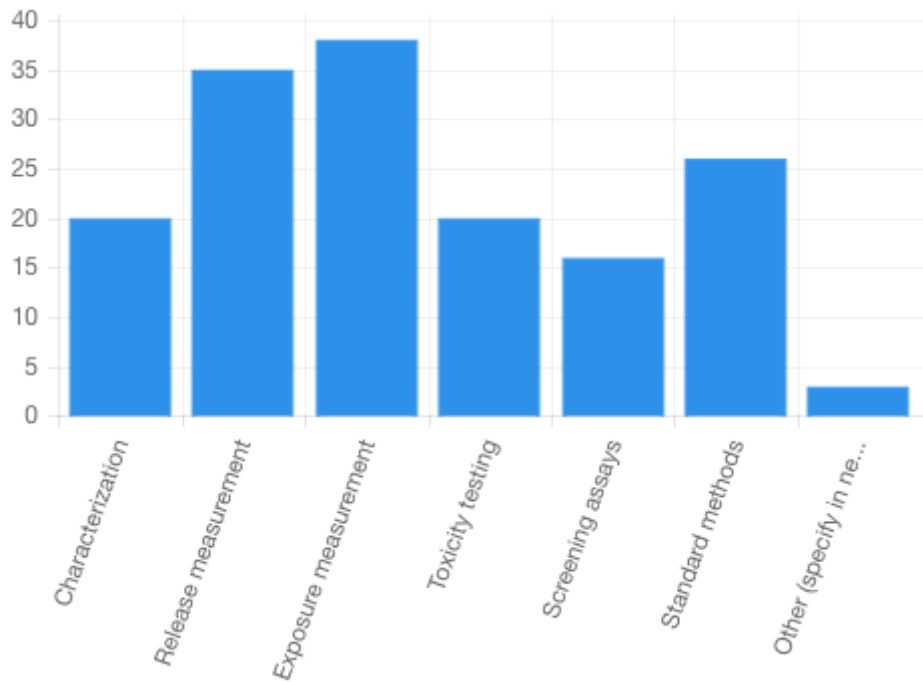
none

surfaces coming into contact food or materials important to become hygienically immaculate

desinfection products, textiles

ID #1647 (<https://scipinion.com/surveys/64/results/1647>)

What developments will be most important in improving risk assessment for new uses of nanoscale SILVER? (Select no more than 3)



Legend

answers: 65

skips: 53

ID #1648 (<https://scipinion.com/surveys/64/results/1648>)

If you selected the Other option above, please identify what other developments you think will be most important in improving risk assessment for new uses of nanoscale SILVER in the next 5-10 years.

Transformation analysis

I have no knowledge of nanoscale silver uses

Life cycle assessment to determine if nanosilver is released and what it transforms to and if it is bio-available to the eventual receptor

none needed

ID #1649 (<https://scipinion.com/surveys/64/results/1649>)

Where will exposure to nanoscale SILVER change (per individual user or exposed population) in the next 5-10 years?

	Decrease	Same	Increase	Total
Food additives/packaging	3.23% 2	17.74% 11	79.03% 49	62
Advanced composites	3.64% 2	38.18% 21	58.18% 32	55
Electronics/optics	3.85% 2	50.00% 26	46.15% 24	52
Construction	7.84% 4	60.78% 31	31.37% 16	51
Agriculture	5.36% 3	41.07% 23	53.57% 30	56
Medical	5.08% 3	16.95% 10	77.97% 46	59

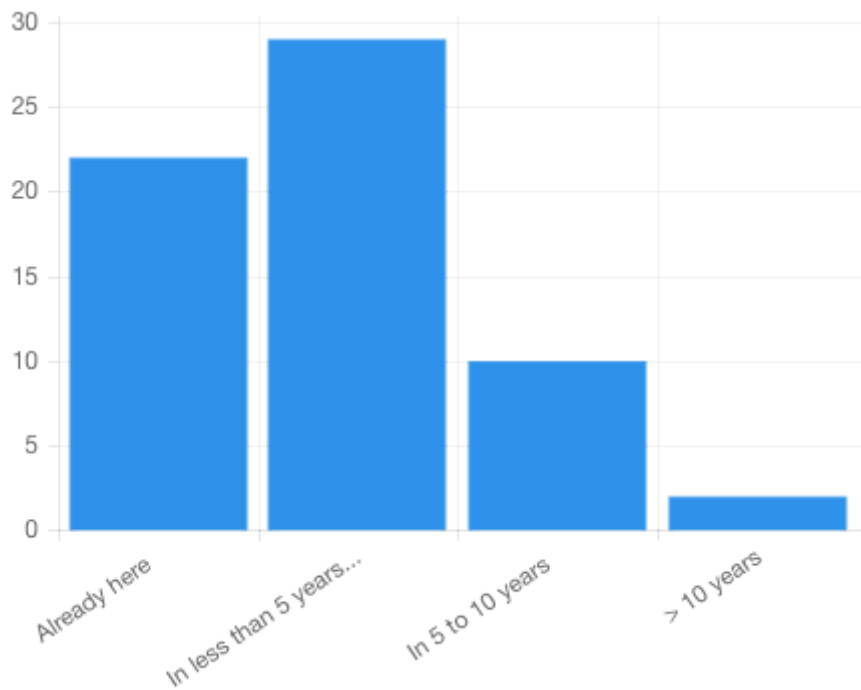
ID #1650 (<https://scipinion.com/surveys/64/results/1650>)

WHEN do you believe EXPOSURE ASSESSMENT METHODS for nanoscale SILVER will be adequate to make decisions on risk management?

Life cycle stage	Already here	In less than 5 years	In 5 to 10 years	> 10 years	Total
Manufacture	50.00% 31	32.26% 20	16.13% 10	1.61% 1	62
Professional use	38.71% 24	41.94% 26	17.74% 11	1.61% 1	62
Consumer use	27.42% 17	38.71% 24	25.81% 16	8.06% 5	62
End of life/environmental	14.52% 9	43.55% 27	30.65% 19	11.29% 7	62

ID #1651 (<https://scipinion.com/surveys/64/results/1651>)

WHEN do you believe TOXICITY ASSESSMENT METHODS for nanoscale SILVER will be adequate to make decisions on risk management?



Legend

answers: 63

skips: 55

ID #1671 (<https://scipinion.com/surveys/64/results/1671>)

Thanks for completing the questions for SILVER. You can now either click on tab to the left to return to an earlier section or continue on to questions for industry by clicking next.

		Total
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SECTION: SAFETY AND INNOVATION

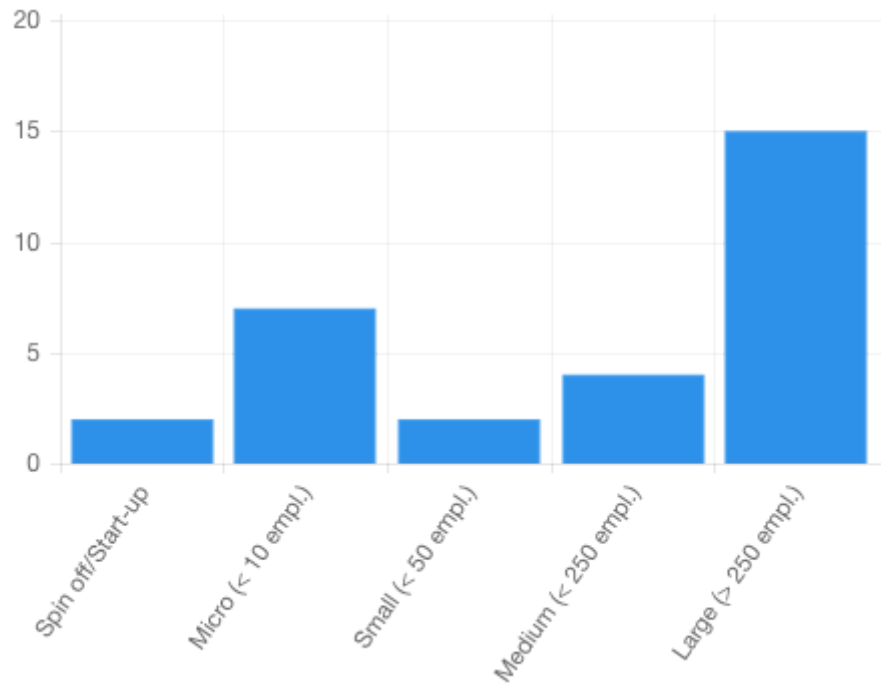
ID #1672 (<https://scipinion.com/surveys/64/results/1672>)

The following questions are for INDUSTRY participants (if you are non-industry then please skip to next at the end of this page) regarding innovation models and information needs along the innovation process so that priorities for supporting adaptive risk governance can be evaluated. Knowing how innovation is managed in industry is a key starting point to address industry needs in the tools developed to support adaptive governance.

		Total
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ID #1602 (<https://scipinion.com/surveys/64/results/1602>)

Please indicate your company size



Legend

answers: 30

skips: 88

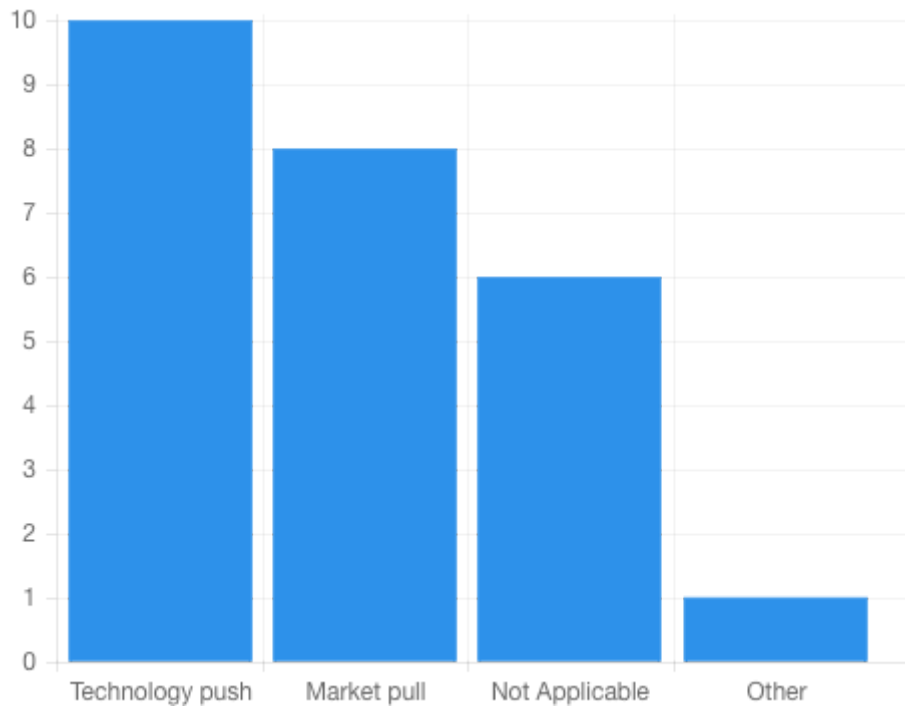
ID #1603 (<https://scipinion.com/surveys/64/results/1603>)

Please specify the main areas of focus for your work (either research, risk assessment, regulatory review, or production) by selecting no more than 3 rows that apply.

	Most of my work	Part of my work	Total
New material design	35.71% 5	64.29% 9	14
New product scale up	0.00% 0	100.00% 8	8
Industrial material production (e.g., MNM supply)	44.44% 4	55.56% 5	9
Formulation (e.g., ingredient manufacture, masterbatches, prepregs, composites for resale to manufacturers)	40.00% 2	60.00% 3	5
Consumer product manufacturer (nano enabled)	37.50% 3	62.50% 5	8
Waste disposal/recycling	0.00% 0	100.00% 5	5
Industrial/professional use (e.g., construction)	25.00% 1	75.00% 3	4
Transportation	0.00% 0	100.00% 1	1
Product stewardship	77.78% 7	22.22% 2	9
Finance or insurance of technology / development	0.00% 0	100.00% 2	2

ID #1604 (<https://scipinion.com/surveys/64/results/1604>)

What is the main driver for innovation in your company?



Legend

answers: 25

skips: 93

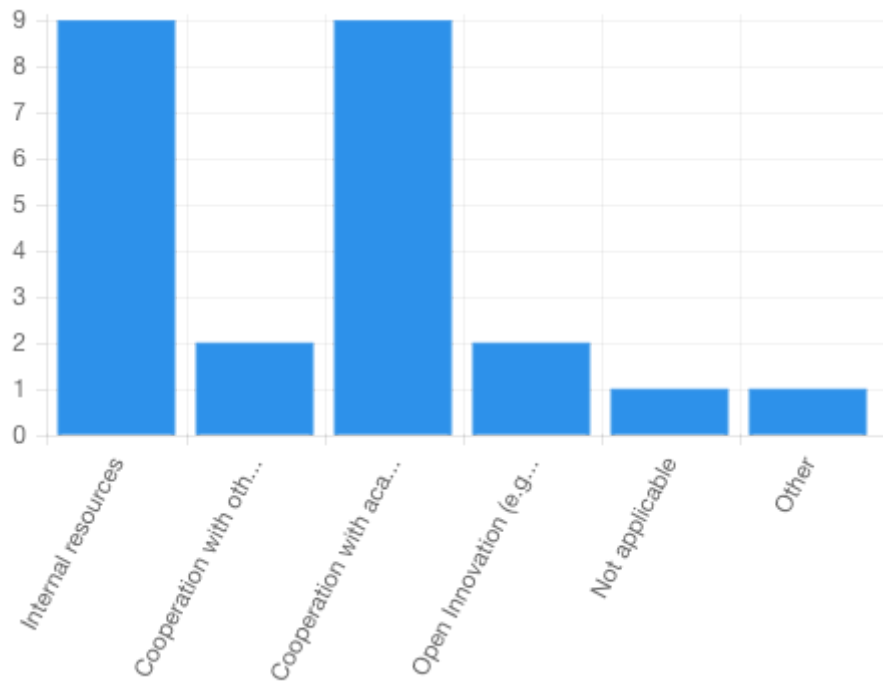
ID #1605 (<https://scipinion.com/surveys/64/results/1605>)

If you selected the 'other' option above then please use the text box here to provide your main driver for innovation in your company.

Risk research

ID #1606 (<https://scipinion.com/surveys/64/results/1606>)

How is R&D carried out in your company (main approach)?



Legend

answers: 24

skips: 94

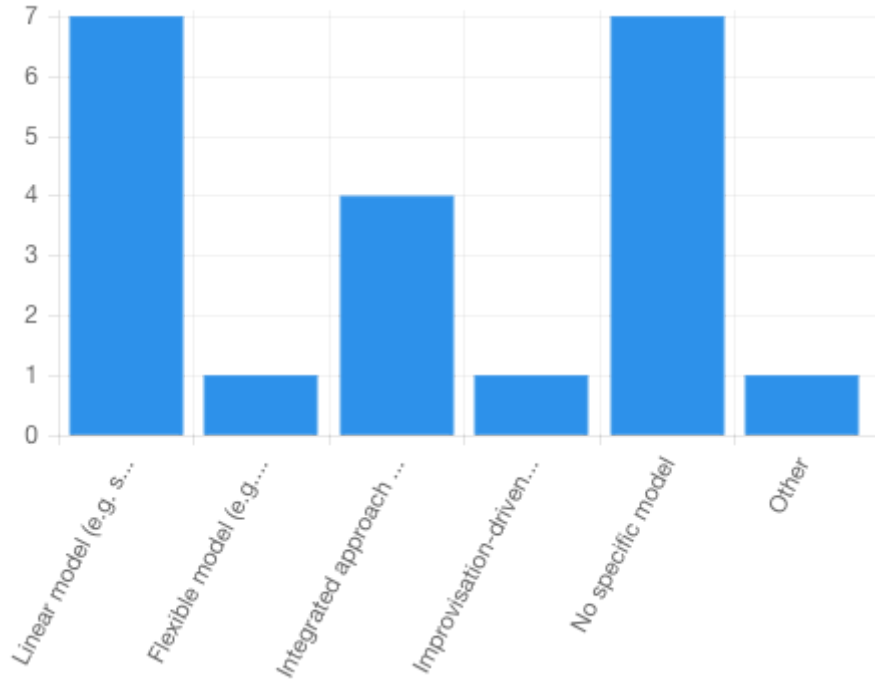
ID #1607 (<https://scipinion.com/surveys/64/results/1607>)

If you selected the 'other' option above then please use the text box here to identify the main approach to carrying out R&D in your company.

Primarily Internal with growing external cooperations with consultants, academia & various research institutions

ID #1608 (<https://scipinion.com/surveys/64/results/1608>)

What kind of innovation process management model does your company apply?



Legend

answers: 21

skips: 97

ID #1609 (<https://scipinion.com/surveys/64/results/1609>)

If you selected the 'other' option above then please use the text box here to identify the kind of innovation process management model your company uses.

Mostly stage-gate but also increasing amount of open innovation and improvisation

ID #1610 (<https://scipinion.com/surveys/64/results/1610>)

At which stage is safety considered?

Stage	Safety is considered as prerequisite for further development	Safety is considered, but is not a blocking factor at this stage	Safety is not considered	Total
Idea/Concept	50.00% 9	38.89% 7	11.11% 2	18
Preliminary investigation (feasibility)	61.11% 11	38.89% 7	0.00% 0	18
Detailed investigation (business case)	64.71% 11	29.41% 5	5.88% 1	17
Development	77.78% 14	16.67% 3	5.56% 1	18
Testing and validation	78.95% 15	21.05% 4	0.00% 0	19
Full production	88.24% 15	5.88% 1	5.88% 1	17
Launch	88.24% 15	5.88% 1	5.88% 1	17
Post-market review	83.33% 15	11.11% 2	5.56% 1	18

ID #1611 (<https://scipinion.com/surveys/64/results/1611>)

Please select the most important information SOURCE for each innovation stage by checking no more than 3 boxes in each column.

	Idea/ Discovery/ Concept	Feasibility study	Business Plan	Prototyping / development	Testing / Validation	Launching	Post Market surveillance	Total
Patents database	9.32% 11	5.93% 7	5.93% 7	4.24% 5	0.85% 1	1.69% 2	4.24% 5	118
Market Reports	4.24% 5	3.39% 4	10.17% 12	3.39% 4	1.69% 2	5.08% 6	5.08% 6	118
Scientific literature	12.71% 15	11.02% 13	2.54% 3	5.08% 6	11.86% 14	2.54% 3	5.08% 6	118
Experts (academia)	10.17% 12	9.32% 11	1.69% 2	5.08% 6	10.17% 12	2.54% 3	3.39% 4	118
Experts (consultancy)	4.24% 5	5.08% 6	2.54% 3	3.39% 4	6.78% 8	4.24% 5	1.69% 2	118
B2B sources	1.69% 2	3.39% 4	3.39% 4	3.39% 4	2.54% 3	5.93% 7	4.24% 5	118
Personal communications	7.63% 9	6.78% 8	4.24% 5	5.08% 6	5.08% 6	4.24% 5	5.08% 6	118

ID #1612 (<https://scipinion.com/surveys/64/results/1612>)

Is there another information source that is particularly relevant to an innovation stage? Please provide the source and the innovation stage in the text box provided.

Internal employee's knowledge & experience in a specific technology or product: Idea; prototyping; testing& validation

Sales and Marketing Departments

Internal safety database from feasibility onwards

ID #1613 (<https://scipinion.com/surveys/64/results/1613>)

Please select the most important information TYPE for each innovation stage by checking no more than 3 boxes in each column.

	Idea/ Discovery/ Concept	Feasibility study	Business Plan	Prototyping / development	Testing / Validation	Launching	Post Market surveillance	Total
Material/s and product/s functionality	11.02% 13	12.71% 15	4.24% 5	10.17% 12	9.32% 11	2.54% 3	2.54% 3	118
Market needs	9.32% 11	5.93% 7	11.86% 14	4.24% 5	6.78% 8	10.17% 12	8.47% 10	118
Competitors development	3.39% 4	3.39% 4	5.08% 6	4.24% 5	0.85% 1	5.08% 6	5.08% 6	118
Research advancement	10.17% 12	7.63% 9	0.85% 1	4.24% 5	7.63% 9	0.00% 0	0.85% 1	118
Product safety	6.78% 8	10.17% 12	6.78% 8	6.78% 8	11.02% 13	5.93% 7	8.47% 10	118
Process safety	2.54% 3	8.47% 10	3.39% 4	6.78% 8	9.32% 11	3.39% 4	3.39% 4	118
Economic potential	7.63% 9	6.78% 8	10.17% 12	3.39% 4	4.24% 5	4.24% 5	2.54% 3	118

ID #1614 (<https://scipinion.com/surveys/64/results/1614>)

Is there another information type that is particularly relevant to an innovation stage? Please provide the type and the innovation stage in the text box provided.

I am a researcher working at a University so many of these topics are not relevant to me so i deliberately left them black to avoid affecting the overall results

Stage gate is not the only management process; All input is valued throughout the process; missing Sales

