



Functional Materials – Micro- and Nanoanalytics

Consultancy and Analysis



Functional Materials – Micro- and Nanoanalytics

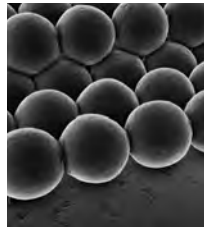
Functional materials on the micro- and nanometre scale are increasingly becoming an essential driver of innovation in research and industry. The physicochemical demands on the characteristics of materials and surfaces turn out to be more and more challenging and specific.

Functional materials are characterised by special chemical, physical, mechanic and electrical properties that can be dependent on size and structure. This provides them with a vast range of application potential in all sorts of fields. For example, they are used in the production of cosmetics, pharmaceuticals, packaging materials and textiles owing to the direct integration of functions into the material or the optimisation of properties.

The WESSLING experts from the department 'Functional materials – Micro- and nano-analysis' support businesses with their know-how in research-intensive projects. Quality analysis services in our modern laboratories as well as competent and individual consulting make the WESSLING scientists a reliable partner in all issues regarding functional materials.

Our services:

- Particle, material and surface analysis
- Nanomaterials
- Microplastics
- Measurement of airborne particles





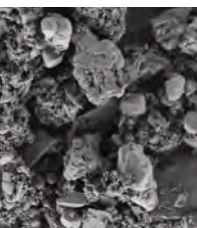
Particle, material and surface analysis

The fields of application for substances in particle form are diverse and can be found in almost every industry sector. The materials that use substances in particle form are manufactured to provide raw materials and consumables and can be found in changed form in intermediary and finished products.

Particle analysis requires measurement methods on a micro- and nanometre scale. WESSLING offers various chemical, physical and microbiological analysis services in this field. Highly precise techniques are employed in particle, material and surface analysis to determine parameters such as structure, shape, size distribution and chemical composition. The analysis of residues of unknown materials is also part of the experts' portfolio.

Our particle, material and surface analysis techniques:

- FTIR microscopy (transmission/reflection/ATR)
- Scanning electron microscopy (FE-SEM/EDX)
- Transmission electron microscopy (TEM/EDX)
- Dynamic and static light scattering (DLS/SLS)
- Sieve analysis
- ICP-MS/ICP-OES
- GC-MS and many more





Nanomaterials

Nanomaterials are of increasing significance in industrial applications as they provide products made by the cosmetics, textile, electrical, pharmaceutical, chemical and other industries with new characteristics that would not be possible with the same materials on a larger scale.

Nanomaterials can be present in the form of particles or fibres. At least one dimension is smaller than 100 nanometres. By way of comparison: the ratio between a nanoparticle and a football is about the same as that between a football and earth.

Owing to their longstanding experience in the field of nano-analysis, the WESSLING experts competently advise and support you in the safe use of nanomaterials in production processes as well as regarding questions about legal provisions, for example, with respect to cosmetics.

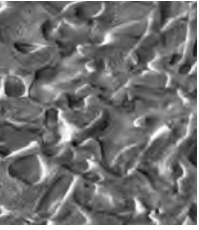


Our range of services in the field of nanomaterials:

- Material and particle analysis: physical and chemical characterisation on a micro- and nanometre scale
- Support in the assessment of nanomaterials as per the legal requirements governing, for example, cosmetic products and food
- Consulting about health and safety in the workplace when handling nanomaterials
- Monitoring of room air quality, including ultrafine particles (UFP)
- Project-based development of new methods for the identification of nanomaterials in the environment (waste water, surface water, fine dust, UFP)
- Ecotoxicological analysis as per ISO standards and OECD guidelines



Micelle analysis for cosmetics and pharmaceutical products



The use of active ingredient delivery systems in cosmetics and pharmaceutical products is growing in importance especially in the field of skincare products. The active ingredient delivery systems consist of biodegradable and easily soluble nanostructures. These include micelles, liposomes, nanoemulsions and lipid nanoparticles.



Micelles form in an oil-water mixture under addition of surfactants. Surfactants are amphiphilic, consisting of a hydrophobic and a hydrophilic molecule part. As a result, surfactants in solution form spherical structures, the so-called micelles, when present in a certain concentration. Their diameter is between 5 and 100 nm.

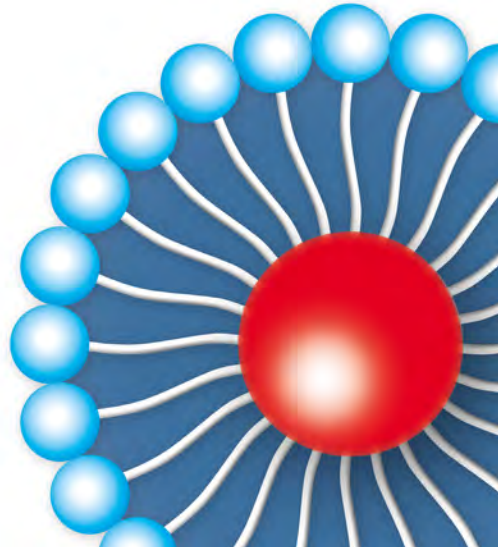


WESSLING offers customers a broad range of services in the field of nano-analysis. The analysis of micelles combines the expertise of nanotechnology experts and cosmetics and pharmaceuticals experts. The experts focus on highly qualified consulting and analysis services that are specifically tailored to individual demands.

We support manufacturers, the manufacturing industry and users of nanomaterials to jointly work towards the best solution in each case – all in a one-stop-shop.

Our range of services in the field of micelle analysis:

- Analysis of emulsions containing micelles by way of Cryo-scanning electron microscopy (CSEM)
- Analysis of size distribution and homogeneity through dynamic and static light scattering
- Assessment of the critical micelle concentration (CMC)
- Personal consulting regarding Regulation (EC) No. 1223/2009 on cosmetic products



Measurement of airborne particles

The contamination of indoor air with fine dust, that is, airborne particles, is of huge relevance, also with respect to hygiene. A wide range of emission sources can cause pollution of indoor air. These include electronic devices such as printers, import of outdoor air through air-conditioning systems and other methods, combustion processes (smoking, chimney, candles), biological sources and dust from abrasion.

State-of-the-art equipment and the know-how of our experts ensure that airborne particles can be measured even down to a scale of ten nanometres to ten micrometres. Both the particle concentration and particle size distribution are measured in real time, for example, to determine emission sources.

Our comprehensive services in the field of air pollution control range from site visits, the compilation of measurement strategies, on-site measuring, evaluations and assessments.

Our range of services in the field of air pollution control – airborne particles:

- Particle measurement on a scale of ten nanometres to ten micrometres and assessment of particle concentration
- Clean room measurements
- Indoor room measurements as per VDI
- Identification of emission sources
- Assessment of results regarding their risk potential and illustration of opportunities for action
- Planning and advisory support and monitoring of measures
- On-site visits and compilation of measurement strategies
- On-site measurements



Microplastics in the environment and food



Owing to their excellent properties, plastics are used as the material of choice in a continuously growing number of fields of application, such as in the field of consumer goods.



Plastic particles on a scale of less than five millimetres are regarded as microplastics. These particles can consist of different kinds of plastics, including polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), polystyrene (PS) and polyethylene terephthalate (PET).

Sources of microplastics contamination of the environment

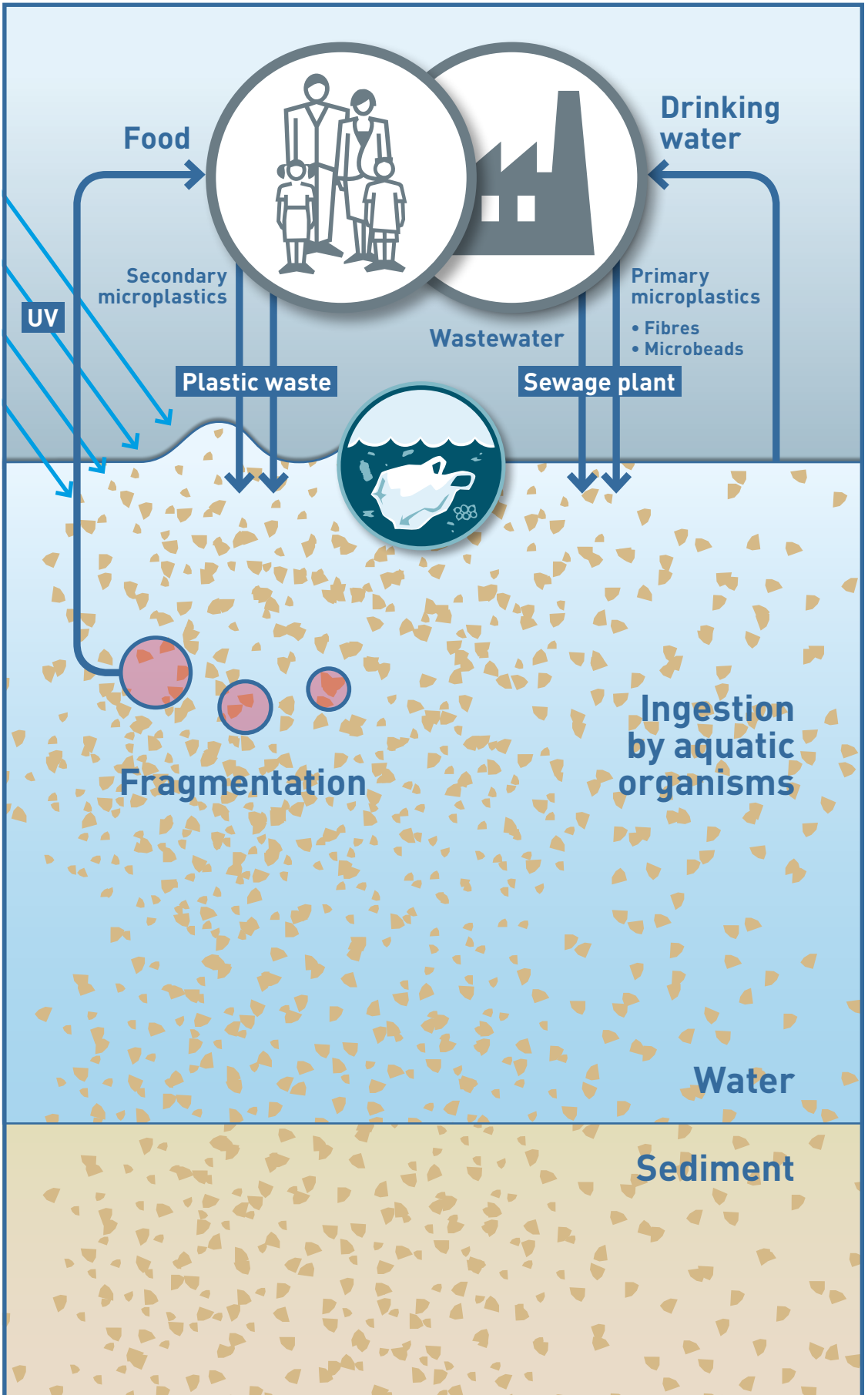
The decomposition of plastics in the environment can take several hundred years. One associated risk is that lifeforms can ingest microplastics, which can be harmful to their health. Studies have revealed the scope of microplastics contamination and its impact on the environment. This included the analysis of microparticles and -fibres in sewage plants, waterbodies (rivers, lakes) and food.

A range of different sources have been highlighted to cause this contamination. For example, microplastics are released into the environment by way of waste water, because sewage plants are unable to fully filter out microplastics. Many cosmetic products such as shower gels and toothpaste contain primary microplastics (microbeads). An added problem is that clothing made from synthetics loses a lot of plastic fibres in every wash, which then are released into the sewage system. In addition, industrial sewage is potentially contaminated by microplastics from abrasion in machines. Another serious problem is the environmental pollution through careless disposal of plastic rubbish, which constitutes a significant threat to the ecosystem around the globe.

Our range of services in the field of microplastics analysis:

- Microplastics analysis by way of FT-IR microscopy
- Qualified sampling
- Project-related development of specific sample preparation methods for different matrices







Functional materials – Micro- and nanoanalytics: Our services

Analysis

- Material and particle analysis: physical and chemical characterisation on a micro- and nanometre scale
- Analysis of micelles in emulsions
- Analysis of microplastics
- Measurement of airborne particles

Consulting

- Consulting on health and safety in the workplace when handling nanomaterials
- Support in the assessment of nanomaterials as per the legal requirements governing, for example, cosmetic products and food
- Project-based development of new analysis methods
- Project-based development of new methods for the identification of nanomaterials and microplastics in the environment (waste water, surface water, fine dust, UFP)
- Coordination and execution of research projects

Germany-wide and international know-how – from a single source.

WESSLING is an international and independent analytical, testing and consulting company represented at 26 locations in Europe and China. 1,600 employees work on the continuous improvement of quality and safety of products and processes of environmental and health protection. We examine, analyse, assess, survey, plan and implement projects – for the sustainable improvement of the quality of life.



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