

Developing Baytubes® under Responsible Care

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Nanotechnology was identified by Bayer MaterialScience (BMS) as a tool and a platform for various innovation and growth areas along the value chain. It will provide high performance product solutions in many sectors, including polymer and adhesive additives, nanocomposite thermoplastics and nano-modified coating systems. As part of its entry into this market, BMS has committed to an extensive Product Stewardship program to ensure safe handling and care for the environment. The development of nanomaterials is taking place within the chemicals industry's Responsible Care® Global Charter framework.

Bayer MaterialScience developed a manufacturing process that allows cost-efficient production of unique multi-wall carbon nanotubes (MWNT, trade name Baytubes®) with a very high quality in a reproducible way. Important uses of Baytubes® are polymer composites with improved mechanical strength or electrical conductivity. The specific production process delivers a product with low content of metal impurities and the absence of soot. Baytubes® are stable agglomerates with a low potential for respirable dustiness which improves the easiness of handling.

Bayer MaterialScience has implemented a comprehensive Product Stewardship program for Baytubes®. The program focuses on characterization, the potential for exposition as well as examination of the intrinsic toxicological and ecotoxicological profile of Baytubes®. Standard guideline studies have been performed with Baytubes following Good Laboratory Practice (GLP), investigating oral, dermal and inhalative acute toxicity. None of them revealed evidence of relevant adverse effects at realistic exposure levels. BMS initiated a sub-chronic inhalation guideline study in order to establish a specific Occupational Exposure Limit for Baytubes®. For the time being and as long as the chronic potential effects have not been fully investigated, BMS doesn't recommend the use of Baytubes® in applications for end-consumers where a potential for inhalative exposure exists (e.g. spray). Users in the value chain find clear handling recommendations in the Safety Data Sheets (SDS). Following these recommendations ensures that no unreasonable exposure of workers or the environment will happen.

Furthermore, Bayer MaterialScience contributes to nanomaterial safety research projects funded by the German Ministry of Education and Research (BMBF), such as NanoCare and TRACER, which focus on the characterisation and the development of a broad scientific consensus on measurement methods and testing procedures for nanomaterial safety assessments.

The level of responsible care taken by all partners along the value chain will strongly influence the success of nanotechnology. In order to ensure the development of beneficial novel products and applications the industrial stakeholders have to ensure that the production, handling, transport and use of products of nanotechnology are safe. The BMS "Code of Good Practice" describes how we intend to fulfill our commitment to promoting human health and environmental safety while realizing nanotechnology's benefits (www.baycareonline.com).