

Regulatory relevant and reliable methods and data for determining the environmental fate of manufactured nanomaterials - DTU Orbit (09/11/2017)

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The widespread use of manufactured nanomaterials (MN) increases the need for describing and predicting their environmental fate and behaviour. A number of recent reviews have addressed the scientific challenges in disclosing the governing processes for the environmental fate and behaviour of MNs, however there has been less focus on the regulatory adequacy of the data available for MN. The aim of this paper is therefore to review data, testing protocols and guidance papers which describe the environmental fate and behaviour of MN with a focus on their regulatory reliability and relevance. Given the often identified need for modification of OECD testing guidelines, the use of these cannot per se be assigned high regulatory adequacy. Though the specific test considerations will differ between conventional chemicals and MN, the ultimate endpoints of interest are similar. The water compartment must be considered as one of the main points of entry, facilitating dispersion of MN in the environment and establishing a link to the other environmental compartments such as soil, sediment, air, and biota. Once released to water various processes like dissolution, agglomeration, heteroagglomeration, sedimentation, interaction with natural organic matter, transformation and uptake by biota are processes of high relevance for the fate of MN in water. In the review it is found that the OECD draft test guidelines for dissolution and agglomeration will greatly assist in the generation of regulatory relevant and reliable data. Gaps do however exist in test methods for environmental fate, such as methods to estimate heteroagglomeration and the tendency for MNs to transform in the environment.

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