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Waste management of ENM-containing solid waste in Europe

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Little research has been done to determine emissions of engineered nanomaterials (ENM) from currently available nano-enabled consumer products. While ENM release is expected to occur throughout the life cycle of the products, this study focuses on the product end-of-life (EOL) phase.
We used the Danish nanoproduct inventory (www.nanodb.dk) to get a general understanding of the fate of ENM during waste management in the European context. This was done by: 1. assigning individual products to an appropriate waste material fraction, 2. identifying the ENM in each fraction, 3. comparing identified waste fractions with waste treatment statistics for Europe, and 4. illustrating the general distribution of ENM into incineration, recycling and landfilling. Our results indicate that â•¿plastic from used product containersâ•¯ is the most abundant and diverse waste fraction, comprising a variety of both nanoproducts and materials. While differences are seen between individual EU countries/regions according to the local waste management system, results show that all waste treatment options are significantly involved in nanowaste handling, suggesting that research activities should cover different areas. The results of this study may be used for the environmental and human health risk assessment of nanowaste, and to assist future regulatory and management decisions.

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