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NIA Comments on the European Commission's *Green Paper on Plastic Waste*

Introduction

NIA acknowledges the publication of the [European Commission Green Paper on Plastic Waste](#) and welcomes the efforts of the European Union to tackle the issue of plastic waste.

NIA welcomes the consultation that is opened by the publication of this green paper.

The [Green Paper](#) published on 7 March 2013 addresses the issue of nanoparticles in plastic waste in section '5.4 Towards more sustainable plastics'.

Comments

Question (14) How can challenges arising from the use of micro plastics in products or industrial processes and of nano-particles in plastics be best addressed?

NIA welcomes the identification by the European Commission of the innovative solutions brought by nanomaterials to plastic materials to improve daily used products such as food packaging plastics. NIA, however, regrets that the Green Paper generally associates nanomaterials to potential 'new risks'.

NIA would like to stress that nanoparticles¹ can be used to enhance the properties of the more environmentally suited plastics that are bioplastics. An example is nanocellulose, a biodegradable material that has several applications in plastics.

When considering the waste stage, the decision-maker should give special attention to the fact that nanoparticles do not solely originate from products to which such particles were deliberately added; processing techniques, such as high-shear mixing, as well as waste treatment techniques, such as shredding, grinding and incineration, can create nanoparticles. The presence of nanomaterials in a product at any stage of the product's life cycle is therefore not dependent on the deliberate addition of nanomaterials to the plastics, since materials added at that stage may have been altered during following production steps (and this no longer be 'nanomaterials'), while others may (inadvertently) have been created.

¹ In this document, **nanomaterials** are understood as defined in the [European Commission's Recommendation on the definition of a nanomaterial](#); **nanoparticles** are individual particles of a given nanomaterial. The Green Paper on Plastic Waste uses both terms interchangeably: it mainly covers nanomaterials, while question 14 is targeting nanoparticles only.

Moreover, plastics to which nanomaterials have been added deliberately should not be regarded as specifically risk-bearing. The potential use of nanomaterials in plastic is twofold; nanoparticles can be used in plastics in one or both of the following forms:

- a) embedded in the plastic, or
 - b) used as a coating on the plastic.
- a) When embedded in the plastic at the design phase, nanomaterials become part of the polymer matrix. Therefore, the use of nanomaterials in the production of a plastic product does not imply the presence of nanoparticles in the final product. In addition, when included in the polymer matrix, nanoparticles are unlikely to be released in the environment at waste stage in the nanoparticulate form, notwithstanding the creation of small (nanoscale) particles that contain (fragments of) the original nanomaterials and polymer matrix, resulting from the above mentioned shredding and grinding processes.
- b) Nanomaterials can also be used as a surface coating; when used in this form (on their own or in matrices), nanomaterials are potentially in direct contact with ambient conditions, and could chemically react and degrade and decompose, and give rise to the release of decomposition products, such as molecules, ions, nanoparticles and material fragments. The risks emerging from such release are being assessed, mostly on a case-by-case basis. By way of an advanced example for such assessment, nanosilver, which is used as a biocide in several products, has been found by many independent studies²³ to lose its nano-properties quickly at the waste stage, as it dissolved into silver-cations and corresponding anions, with the former being precipitated as silversulfides or silverselenides, transforming all following steps of environmental considerations to those of chemical assessment for silver-compounds.

In summary, NIA agrees that nanomaterials in plastic waste should be risk-assessed on a case-by-case basis, as is the current general agreement on risk assessment of nanomaterials. Specific attention should be given to ascertain the presence of nanomaterials in a plastics sample that is to be risk-assessed. Moreover, the inclusion of nanomaterials in plastics should not be generalised as an indication of 'new risks', because the presence of nanoparticles in plastic waste does not depend on the deliberate addition of nanomaterials to the plastic.

A nano-specific provision on the legislation of plastic waste would therefore wrongfully stigmatise the nanotechnology industries in the public eye and target those industries only that add nanomaterials for enhancement of the resulting products (sometimes with regard to environmental issues and sustainability), while other processes that might give rise to nanoscale materials being present at the end-of-life of plastics are being overlooked.

Considering the broader issue of waste management, NIA would also like to remind the European Commission that nanotechnologies offer numerous options for the remediation of waste sites.

² [NIA News Article. 2013. 'Swiss Study concludes that Nanosilver is efficiently neutralised in Wastewater Systems', nanotechia.org](#)

³ [Okkyoung Choi, Thomas E. Clevenger, Baolin Deng, Rao Y. Surampalli, Louis Ross Jr., Zhiqiang Hu. 2009. 'Role of sulfide and ligand strength in controlling nanosilver toxicity' Water Research, Volume 43, Issue 7, pp. 1879-1886](#)

The Nanotechnology Industries Association

Formed in 2005 by a group of companies from a variety of industry sectors including healthcare, chemicals, automotive and consumer products, the Nanotechnology Industries Association (NIA) creates a clear single voice to represent the diverse industries in the multi-stakeholder debate on nanotechnologies. NIA provides a purely industry-led perspective, derived from the views of the collective membership and forms an interface with government, acting as a source for consultation on regulation and standards, communicating the benefits of nanotechnologies and interacting with the media to ensure an on-going advancement and commercialization of nanotechnologies.

For further information visit <http://www.nanotechia.org> or contact us on enquiries@nanotechia.org.