Detection and characterisation of nanomaterials in complex aqueous matrices

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A steadily increasing amount of nanomaterials (NM) is being produced by industry and used in various consumer products, such as health care and cosmetics. Therefore, the unintended release of NM to the aquatic environment seems inevitable and has already been documented in several reports. Analytical tools that allow the detection and characterisation of NM, especially in complex, aqueous matrices, are therefore urgently needed. Engineered nanoparticles (ENP) are defined as particles with at least one dimension <100 nm. ENP occur in a variety of shapes (spheres, platelets, rods), elemental compositions (Ag, TiO2, C-based ENP) and are synthesised with various capping agents (citrate, PVP, gum arabic). These physical-chemical properties may affect the reactivity, the transport and (eco)-toxicological response of the ENP. Recently, promising research has been done to characterise and quantify ENP. Size separation techniques such as field flow fractionation (FFF) have been on-line coupled to analytical techniques such as mass spectrometry, dynamic and static light scattering as well as single particle ICP-MS. Furthermore, individual size fractions have been prepared for detailed electron microscopy analysis. Using these sophisticated combinations of analytical tools, ENP in both their pristine state and transformed after being exposed to different environmental conditions have successfully been investigated. However, despite the recent progress in this research field, the detection and quantification of ENP in complex matrices is still in its infancy. This session therefore aims to generate an overview of the current state of nanoparticle analysis and to provoke a discussion about most pressing research questions in that field. We invite researchers from academia, government, industry or research institutes to share their latest findings and experiences on methods used for the detection and characterisation of nanomaterials in aqueous matrices.

Keywords: nanoparticles, analysis, inorganic, organic, aqueous matrices

SESSION TYPE: Platform and Poster