Study on environmental behavior of typical nanomaterials based on hollow fiber flow field-flow fractionation

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With the development of nanoscience and nanotechnology, the environmental effects and biological safety of nanomaterials, especially engineered nanomaterials, have sparked exponential growth of research. Silver nanoparticles (AgNPs), known as one of the most widely used nanomaterials, have drawn great interest due to their adverse effects on the environment and health. Given the highly dynamic properties of AgNPs, it is believed that AgNPs and ionic silver (Ag(I)) are coexisting and undergo inter-transformation in the environment. Herein, we firstly developed a novel method based on on-line coupling of hollow fiber flow field-flow fractionation (HF5) with inductively coupled plasma mass spectrometer (ICPMS) for characterization and quantification of different sized AgNPs and Ag(I). Furthermore, the proposed methods was successfully used to study the transformation of Ag(I) to AgNPs in the presence of natural organic matter under sunlight. The unusual properties of carbon-based nanomaterials (e.g., fullerol) have also led to a rapid increase in their production in a wide range of application. To understand its fate and transport in aquatic environments, impacts of sunlight and humic acid on the aggregation of fullerol were studied in detail.

[1] Tan et al. (2015) *Anal. Chem.* 87, 8441-8447. [2] Hu et al. (2013) *Chem. Rev.* 113, 3815-3835.