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Assessing competitive adsorption between natural organic matter and polyamide-6 microplastics and their effects on microplastic behaviour

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With increasing plastic pollution, efforts to understand the implications of environmental weathering and matrices on the resulting fragmented microplastics is critical to better understand the implications on health and environment of these emerging contaminants. With the prevalence of fragmented micro- and nanoplastics in the aquatic environment, the assessment of possible interactions between microplastics and other emerging contaminants of great importance due to their potentially compounding harmful effects. Like microplastics, natural organic matter (NOM) is widely present in aquatic environments, and the interplay between microplastics and NOM have been shown to play an important role in particle behaviour and their ability to transport contaminants.

This work centres around polyamide-6 (PA-6) microplastics, which are abundant in aquatic environments from urban and industrial sources. PA-6 microplastics were systematically produced as irregularly shaped using accelerated weathering techniques to probe specific particle properties such as surface charge and particle size. Studying irregularly shaped particles is key to better understanding secondary microplastic pollution behaviour in the natural environment. The synthesized microplastics were exposed to humic acid and divalent heavy metals in competitive adsorption assays under varying physicochemical conditions to elucidate changes in microplastic behaviour.