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Nanomaterial Fate and Exposure Research: Where we are now and where we need to be to model environmental exposure

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A decade of research on nanomaterial fate and exposure has led to greater understanding of the environmental fate of nanomaterials, their potential risks (and benefits), and an overall better understanding of the role of nanophase materials in environmental processes such as nutrient cycling. This research has also led to a better understanding of how the system complexity makes predicting nanomaterial behaviors challenging, and has identified the need for new tools and approaches to quantify and characterize nanomaterials in situ. Despite these advances in knowledge, there remains a gap between fundamental data collection and the data needs for developing and parameterizing models for predicting environmental flows, fate and exposure. This talk will summarize on the one hand the advances in understanding nanomaterial behavior in complex environmental systems made over the past decade, and will highlight the critical areas of research needed to continue advancing our understanding. On the other hand, it will present where we are standing with respect to understanding the actual flows of nanomaterials to the environment and possibilities to model their environmental fate. The future lays in a more intimate collaboration between experimental and modeling work and we will be plotting a path towards better coupling of experimental work and model development and validation.

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