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A Dynamic Probabilistic Material Flow Modeling Method for Environmental Exposure Assessment of Engineered Nanomaterials

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Material flow modeling constitutes an important tool to predict and understand the flows of materials through the technosphere into the environment. We present a new â•¿Dynamic Probabilistic Material Flow Assessment (DPMFA) method, combining dynamic material flow modeling with probabilistic modeling. The new method represents a significant step forward compared to established MFA or dynamic MFA methods because it allows to consider a large range of different uncertainties for all relevant model parameters. The modeler has the free choice to use distributions functions, or discrete data to describe the uncertainty of all parameters, allowing to make full use of the available data with varying degree of uncertainty. We implemented the method as simulation framework in Python to support experts from different domains in the development of their application models. In the talk we first introduce the DPMFA method and the simulation framework. Then we show an exemplarily application of the framework to predict current and future environmental concentrations of carbon nanotubes for Switzerland.

Primary author: BORNHOFT, Nikolaus A. (EMPA)

Co-author: HILTY, Lorenz M. (EMPA)

Presenter: BORNHOFT, Nikolaus A. (EMPA)

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