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Lessons learned from nanogeosciences for engineered nanoparticles and microplastic reserach

Professor Thilo Hofmann received his Ph.D. in aquatic geochemistry from Bremen University in 1998. From 1999 he was first a post-doctoral scholar, and then Assistant Professor at Mainz University. Since 2005 Prof. Hofmann has been Full Professor and Chair for Environmental Geosciences at the University of Vienna. His group works in nanogeosciences, environmental impact of nanotechnology, investigates trace contaminants and sorption to carbonaceous materials and microplastic, and in hydrogeology, including vulnerability analysis. Prof. Hofmann served as Vice Dean of the Faculty for Earth Sciences, Geography and Astronomy from 2006 to 2012 and then as Dean of the Faculty until 2016. He is director of the University of Vienna's Environmental Research Network, which he established in 2014; the network includes more than 130 scientists from the natural sciences, the social sciences, the humanities, law, and economics, aiming to tackle today's environmental challenges. In March 2019 he was one of the founding members of the new Center for Microbiology and Environmental System Sciences at the University of Vienna.

Prof. Hofmann has published more than 150 peer-reviewed papers. He has received awards from the German Academic Scholarship Foundation, Berlin Technical University (the Erwin-Stephan Prize), and the German Water Chemical Society. In 2017 he was appointed Adjunct Full Professor in the Department of Civil and Environmental Engineering at Duke University (US). In 2018 he was honored as Guest Professor at the College of Environmental Science and Engineering at Nankai University, Tianjin (China).

Talk: My talk will address natural (NPs), engineered (ENPs) and microplastic (nano)particles (MPs). Globally, surface and groundwater resources are the most important sources for drinking water supply. Surface waters and groundwater resources are, however, prone to threats from emerging contaminants, including nanoparticles. The production and use of emerging contaminants inevitably leads to their release into aquatic environments, besides many others, also engineered nanoparticles and mircoplastic (nano)particles. Concerns therefore arise over the possibility that also ENPs and MPs might pose a threat to drinking water supplies. Investigations into the vulnerability of drinking water supplies to ENPs and MPs are hampered by the absence of suitable analytical methods that are capable of detecting and quantifying them in complex aqueous matrices. Even though many concepts have been developed in nanogeosciences for natural particles, they are seldom used for ENPs and MPs. Analytical data concerning the presence of ENPs and MPs in drinking water supplies is scarce. The eventual fate of ENPs and MPs in the natural environment and in processes that are important for drinking water production are currently being investigated through laboratory based-experiments and modelling. Although the information obtained from these studies may not, as yet, be sufficient to allow comprehensive assessment of the complete life-cycle of ENPs and MPs, it does provide a valuable starting point for predicting their relevance. This talk will address specific aspects concerning the detection and prediction of nanoparticle fate, including natural, engineered and microplastic particles. It will focus on both, new analytical concepts and "old" knowledge from nanogeoscience, which might be of importance for MPs research.