

Abstract Submitted
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The filtration of colloidal gold nanopartilces in nanoporous media¹ FRANCISCUS DE JONG, MICHAEL SCHLUETER, Hamburg University of Technology - Institute for Multiphase Flows, INSTITUTE FOR MULTIPHASE FLOWS TEAM² — Deep-bed filtration is connected to a wide variety of disciplines ranging from biology and medicine to engineering. A novel material with promising perspectives that can be used for deep-bed filtration are forests consisting of numerous multi-walled carbon nanotubes (MWCNTs). The filtration kinetics of particles within deep-beds is usually addressed using global investigations (i.e. the concentration of particles in the bulk solution). However, to optimize MWCNT forests for filtration purposes detailed information of the local filtration kinetics is indispensable. In the study presented here microbeam small-angle X-ray scattering (muSAXS) is used, for the first time, to study both, the spatial and the temporal local filtration kinetics of small-sized particles within MWCNT forests. The filtration is (globally) verified based on (I) scanning electron microscopy and (II) inductively coupled plasma atomic emission spectroscopy (ICP-AES). Good agreement is observed between the local and the global measurements (i.e. a difference of 4.3%). The use of muSAXS to understand the local filtration kinetics of submicrometer particles opens up pathways to effectively optimize functionalized MWCNT forests and prepare them for specific filtering purposes.

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