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The deposition of gold nanoparticles in MWCNT forests FRANCISCUS DE JONG, Hamburg University of Technology (Hamburg, Germany), ADELINE BUFFET, German Electron Synchrotron (Hamburg, Germany), MICHAEL SCHLUETER, Hamburg University of Technology — The deposition, i.e. transport and attachment, of small-sized particles is a basic process, on which many applications are based. The innumerable applications range from biology and medicine to engineering. Due to their promising mechanical properties multi-walled carbon nanotubes (MWCNTs) have gained increasing popularity in the past decade. A large number of dense packed vertically aligned MWCNTs form a so-called MWCNT forest. In our study we functionalized the MWCNT forest to filter gold nanoparticles from a colloidal suspension. An experimental investigation was carried out in which the particle deposition kinetics was locally determined with small-angle X-ray scattering (SAXS). Furthermore, inductively coupled plasma atomic emission spectroscopy (ICP-AES) was used to verify the local observations. It was concluded that both, SAXS and ICP-AES investigations shows very good agreement. Furthermore, an analytical deposition model was developed based on the DLVO-theory. The experimental and theoretical investigation presented here give insight in the deposition kinetics within a MWCNT forest. The results open up pathways to optimize MWCNT forests for filtering purposes.

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