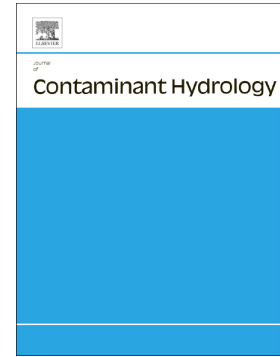


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# Upscaling of Nanoparticle Transport in Porous Media under Unfavorable Conditions: Pore Scale to Darcy Scale

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## Abstract

Transport and deposition of nanoparticles in porous media is a multi-scale problem governed by several pore-scale processes, and hence, it is critical to link the processes at pore scale to the Darcy-scale behavior. In this study, using pore network modeling, we develop correlation equations for deposition rate coefficients for nanoparticle transport under unfavorable conditions at the Darcy scale based on pore-scale mechanisms. The upscaling tool is a multi-directional pore-network model consisting of an interconnected network of pores with variable connectivities. Correlation equations describing the pore-averaged deposition rate coefficients under unfavorable conditions in a cylindrical pore, developed in our earlier studies, are employed for each pore element. Pore-network simulations are performed for a wide range of parameter values to obtain the breakthrough curves of nanoparticle concentration. The latter is fitted with

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