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Transport and Morphology of Nanoparticle Aggregates in Packed Beds: Findings from LBM simulations NGOC PHAM, DIMITRIOS PAPAVASSILIOU, The University of Oklahoma — Aggregation of colloidal particles in porous media has attracted attention because of possible pore clogging and sedimentation, which reduces the particle breakthrough. In addition, in some systems, further attachment of colloidal particles on deposited aggregates is expected. In this study, the morphology of nanoparticle aggregates, propagating in beds packed with spheres under different electrolyte conditions, is numerically investigated. In our simulation, the nanoparticles are advanced by balancing forces such as drag, random force, buoyancy, gravitational force, electrostatic repulsion, and van der Waals attractive force. When the van der Waals forces take over, the aggregates are formed. The packed beds are made of spheres, either ideally packed or randomly packed in simulation boxes. Sequentially, the flow field of water inside the packed beds is generated, using the lattice Boltzmann method (LBM). In conjunction with that, a Lagrangian framework [1, 2] is applied to record the trajectories of the free nanoparticles and the aggregated nanoparticles. Within the scope of this study, we draw attention to the change of the morphology of the aggregates, reflected by their fractal dimension, under various electrolyte and packing conditions. **REFERENCES** 1. R. S. Voronov, S. VanGordon, V. I. Sikavitsas, D. V. Papavassiliou, Int. J. Num. Meth. Fluids, 67, 501-517, 2011 2. N.H. Pham, D.P. Swatske, J.H. Harwell, B-J Shiau, D.V. Papavassiliou, Int. J. Heat & Mass Transf., 72, 319-328, 2014.

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