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Coupling micro-CT with computer simulations to analyze dispersion in porous media SADAF SOBHANI, JARED DUNNMON, MICHAEL WERER, Stanford University — In recent years, table-top X-ray Computed Tomography (XCT) systems have been utilized to analyze various samples with a resolution on the order of $1\mu m$-$100\mu m$. In this study, we explore the use of these systems both in extracting high-resolution topologies of porous structures for use as inputs into computational simulations and in directly characterizing gas dispersion within such structures using fluoroscopic imaging of dense gaseous tracers. The opaque-solid environment and small pore-scale effects in porous media restrict the use of conventional imaging techniques, thereby making XCT a potentially useful diagnostic technique for understanding internal flows in porous and optically inaccessible structures. In the present work, we extract the topology of various reticulated porous foams from 3D XCT data and perform numerical simulations of the flow inside these structures. Permeability and tortuosity, which are key parameters in volume-averaged models are evaluated from the resulting flow fields and knowledge of the solid structure.

Sadaf Sobhani
Stanford University

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