On the Resistance of Nanofibrous Superhydrophobic Coatings to Hydrostatic Pressures\textsuperscript{1} T.M. BUCHER, B. EMAMI, H. VAHEDI TAFRESHI, M. GAD-EL-HAK, G.C. TEPPER, Virginia Commonwealth University — We present a numerical study aimed at investigating the influence of microstructural parameters on the resistance of submerged fibrous superhydrophobic coatings to elevated hydrostatic pressures. In particular, we generate 3-D virtual geometries comprised of randomly or orthogonally oriented horizontal fibers with bimodal diameter distributions resembling the microstructure of coatings produced via DC and AC electrospinning, respectively. These virtual geometries are then used as the computational domain for performing Full Morphology (FM) simulations to establish a relationship between the coatings’ critical pressure—pressure beyond which the surface departs from the Cassie state—and their microstructures. Our numerical simulations are aimed at providing guidelines for the design and optimization of the coatings’ microstructures.

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