Abstract Submitted
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Dimensional percolation of sheared nano-rod dispersions and consequences for highly anisotropic property tensors[1] M. GREGORY FOREST, University of North Carolina at Chapel Hill, XIAOYU ZHENG, Kent State University, RUHAI ZHOU, Old Dominion University, RICHARD VAIA, Nanostructured and Biological Materials Branch, AFRL/MLBP — The Doi-Hess theory for flowing nano-rod dispersion yields orientational probability distribution functions for the nano-particle phase in flow-processed thin films. These numerical databases for variable shear rate, particle aspect ratio and volume fraction are then combined with a Monte Carlo algorithm to populate sheared dispersions. Nano-rod cluster statistics are then computed to determine percolation thresholds, which yield transitions from zero to one, two and three dimensional percolating paths. Finally, effective property enhancements are computed which include standard volume-averaged homogenization and percolation cluster statistics.

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