

Abstract Submitted
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Modeling of Fluid Flow and Heat Transfer in Nanotube and Nanowire Forests MICHAEL MARTIN, Louisiana State University — Bundles of nanotubes, also known as nanotube forests, are under consideration for applications such as chip cooling and pre-concentrators for biodetection. Scaling law analysis shows that the air flow through these forests at atmospheric pressure is in the free-molecular flow regime. Based on the linearized free-molecular flow equations, a model is presented for the pressure drop and heat transfer in these systems. The momentum and energy equations are coupled, requiring that they be solved simultaneously. Results show large pressure drops, and a non-linear pressure distribution, similar to that seen in rarefied micro-channel flows.

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