Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Reducing thermophoretic deposition in heat exchangers using wavy walled channels[1] ZACHARY MILLS, ALEXANDER ALEXEEV, Georgia Institute of Technology — Using computational simulations, we examined the effect of wavy walled geometries on the fouling of heat exchangers. Our model combines a lattice Boltzmann model for simulating the fluid flow, a finite difference temperature model and a Brownian dynamics model used to model the transport and deposition of aerosol particles. In our previous studies, we investigated how the geometry influences the structure of the flow within the channel. Specifically, we determined the critical pressure gradients at which the flow transitions between different flow regimes for various wave amplitudes and periods. We observed three separate flow regimes including steady flow with and without circulation and unsteady time-periodic flow. We have extended this investigation to examine the effects of these different geometries and flow regimes on heat and mass transport within the channel. In our simulations we investigated particle deposition resulting from convection and thermophoresis. From the results of our investigations we will be able to determine the geometries which reduce the rate of fouling in heat exchangers while increasing heat transport.

[1]This work is supported by General Motors Corporation.

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Date submitted: 31 Jul 2014 Electronic form version 1.4