

Abstract Submitted
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Continuum model for suspension conductivity under flow TYLER

OLSEN, KEN KAMRIN, Massachusetts Institute of Technology — An electrically insulating fluid may be made conductive by suspending conductive particles in it. In these suspensions, the conductivity is imparted by a percolating contact network between the particles. It has been shown experimentally that shearing flow strongly affects the conductivity of a suspension, presumably via altering the structure of the contact network. This contact structure can be described by a statistical tensor quantity known as the fabric tensor, which reflects the average number and orientation of contacts on a particle. We derived a model that relates the electrical conductivity tensor to the fabric tensor. Additionally, we propose an evolution for the fabric under flow. Using these two models, we have been able to fit conductivity measurements of carbon-black suspensions under steady-state shear and transient shear flows.

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