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Random Resistor Networks and Porous Media AHMAD ZAREEI, SHIMA PARSA, ARIEL AMIR, Harvard University — Pore-level flow distribution in a disordered porous medium is determined through its heterogeneous micro-structure. Dissolution of solid matrix or solute retention during flow of a solution dynamically changes the micro-structure, affects the velocity distribution of pores in unpredictable ways, and further changes the bulk behavior. In order to understand the dynamics of local structural changes during polymer solution flow and its effects, we investigate random resistor networks as a model of disordered porous medium. The network of pores is modeled using connected network of pipes with a random distribution of diameters, and then the critical behavior and averaging behavior of such networks are developed. We further study the dynamics of structural changes during polymer retention process in the random resistor network, and show how this model is able to predict local process of polymer retention, micro-structural changes, flow velocity distribution of pores, and bulk properties consistent with experiments.

Ahmad Zareei
Harvard University

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