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Flow in heterogeneous media and autocatalytic reaction using lattice BGK simulations NOLWENN JARRIGE, JÉRÔME MARTIN, NICOLE RAKOTOMALALA, DOMINIQUE SALIN, LAURENT TALON, Lab FAST, Bat 502, Campus Univ, Orsay, F-91405, France — Autocatalytic reaction front between two reacting species is able to propagate as a solitary wave that is at constant velocity and with a stationary concentration profile resulting from a balance between molecular diffusion and chemical reaction. In the presence of a hydrodynamic flow, the wave moves with a higher velocity. Indeed, as in Taylor's dispersion, the flow velocity field increases the dispersion across the chemical front and therefore the front velocity. Using lattice BGK simulations, we use this property to deduce some characteristics of a heterogeneous medium. The medium consists of a two dimensional heterogeneous fracture, the mean permeability, the heterogeneities and the correlation length of which are known. The flow through the fracture is solved using Darcy-Brinkman equation. The dispersion of heterogeneities involve heterogeneities in the hydrodynamic field. We study the influence of the flow field heterogeneities on the chemical velocity. We will discuss the relevance of the quantitative measurements to characterize the porous medium.

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