CAN WE OPTIMIZE THE COATING OF HETEROGENEOUS SURFACES

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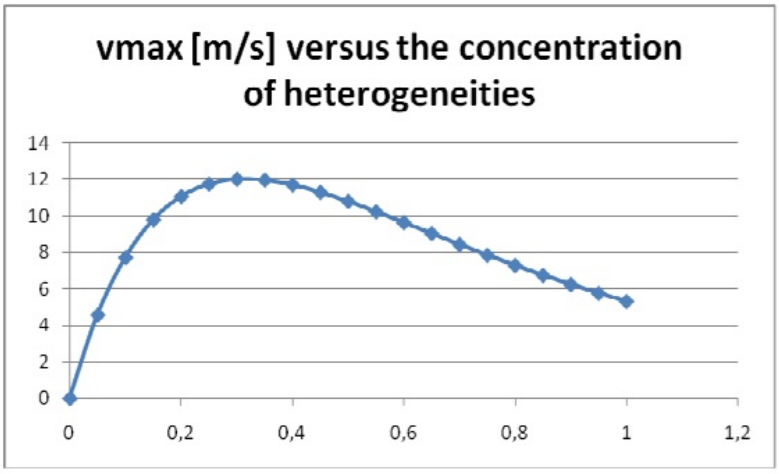
During this talk, I will review new evidences of the validity of the molecular kinetic theory. We study the spontaneous spreading of liquid drops on FCC solid substrates using large-scale molecular dynamics simulations. By varying the solid lattice parameter, five different drop/solid dynamic systems are investigated. It is shown that the results are in agreement with the molecular-kinetic theory (MKT) describing the dynamics of wetting. Moreover, it is established that the microscopic parameters resulting from fits using the MKT, the so-called molecular jump frequency at equilibrium and the jump length, correspond to the values that can be estimated directly from the simulations. This agreement strongly supports, once more, the validity of the MKT at the microscopic scale.

Using then this theory combined with other considerations such as Cassie- Baxter relation, we can predict the maximal speed of coating in the presence of heterogeneities on the solid surface. It will be shown that there is quite often a maximum for the speed of coating (before air entrainment) versus the concentration c of heterogeneities leading thus to a possible simple way to optimize the coating speed.



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