

Abstract Submitted
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Lattice-Boltzmann Simulation of Tablet Dissolution in Complex Hydrodynamic Environment JIAOLONG JIANG, NING SUN, Materials Science and Engineering Department, Stony Brook University, Stony Brook, NY, 11794, USA, TAESHIN PARK, GLEN H. KO, RES Group Inc., 1 Broadway, Cambridge, MA, 02142, USA, DILIP GERSAPPE, Materials Science and Engineering Department, Stony Brook University, Stony Brook, NY, 11794, USA — Using the Lattice-Boltzmann method, we developed a 3D model to study the tablet dissolution process in a complex hydrodynamic environment involving spatially varying velocity and shear forces. The results show that a turbulent flow is formed in the region above the tablet, which has been obtained by visualization experiments. The dissolution profiles were obtained by incorporating detailed kinetics, showing good agreement with case studies from literature. After studying the influence of the paddle speed and the size of the system, we simulated the dissolution process for multicomponent tablets. Our results indicate how the hydrodynamic environment would affect the dissolution process by changing the local concentration of components near the tablet as well as by the particle erosion under high fluid velocity. Since the code was successfully parallelized, the simulation for comparatively large systems is possible now.

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