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Lattice-Boltzmann Simulation of Tablet Disintegration JIAOLONG JIANG, NING SUN, DILIP GERSAPPE, Department of Materials Science and Engineering, Stony Brook University, Stony Brook, NY, 11794, USA — Using the lattice-Boltzmann method, we developed a 2D model to study the tablet disintegration involving the swelling and wicking mechanisms. The surface area and disintegration profile of each component were obtained by tracking the tablet structure in the simulation. Compared to pure wicking, the total surface area is larger for swelling and wicking, which indicates that the swelling force breaks the neighboring bonds. The disintegration profiles show that the tablet disintegrates faster than pure wicking, and there are more wetted active pharmaceutical ingredient particles distributed on smaller clusters. Our results indicate how the porosity would affect the disintegration process by changing the wetting area of the tablet as well as by changing the swelling force propagation.

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