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Simulation of bubble growth in polymer foaming PENGTAO YUE, JAMES FENG, University of British Columbia, CHRISTOPHER BERTELO, Arkema Research Center, HOWARD HU, University of Pennsylvania — Bubble growth plays an important role in determining the cell size distribution in thermoplastic foams. In this work, the diffusion-driven bubble growth in a polymer melt is computed by direct numerical simulation. The pressure and mass inside each bubble follow the equation of state for an ideal gas. A finite element method is used to calculate the gas concentration and flow variables in the polymer melt. Henry's law is employed to relate the bubble pressure and the gas concentration at the bubble surface. An Arbitrary Lagrangian-Eulerian (ALE) technique is used to handle the moving boundary. Within each time step, the whole system is solved iteratively. By modeling the polymer melts as Oldroyd-B fluids, we will study the influence of rheology on single bubble growth and interactions between multiple bubbles.

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