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Effects of polydispersity on the order-disorder transition of diblock copolymer melts[1] TOM BEARDSLEY, MARK MATSEN, University of Reading — The effect of polydispersity on an AB diblock copolymer melt is investigated using lattice based Monte Carlo simulations with parallel tempering (PT) techniques. We consider melts where the B blocks are monodisperse and the A blocks are polydisperse with a Schultz-Zimm distribution. Expanding our previous work on polydisperse melts of symmetric composition, we now construct a polydisperse phase diagram, investigating the size of the domains and locations of the order-disorder (ODT) and order-order (OOT) transitions. The PT method has yielded a number of benefits over single-processor temperature scans, including: simulating a number of temperatures simultaneously, annealing out defects in the configurations more readily and capturing the distinctive spike in the heat capacity that occurs at the ODT, allowing the location of the transition to be determined more accurately than in previous studies. The results are compared to those of experiment and to the predictions of self-consistent field theory (SCFT).

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