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Simultaneous Prediction of Upper and Lower Critical Temperatures in Polymer Solutions Using a Constant Parameter Set ELIZABETH CLARK, JANE LIPSON, Dartmouth College — Polymer solutions commonly exhibit phase separation and so the ability to predict temperatures and compositions associated with immiscibility is advantageous to experimentalists. We have been applying a simple lattice model that is capable of capturing both upper (UCST) and lower critical solution temperature (LCST) type phase behavior for polymer blends. Most recently we have become interested in mixtures which simultaneously exhibit both types of phase behavior. Examples include polyisobutylene (PIB) in pure and mixed solvents, and cyclohexane/polystyrene mixtures. We have found that with a single set of temperature-independent parameters the lattice theory is capable of capturing all the physics of these solutions; in addition we discuss conditions under which 'hourglass' phase diagrams result.

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