Abstract Submitted
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**Thermodynamically Self-Consistent Theory of Crystalline Polymer Blends**[1] THEIN KYU, University of Akron — Thermodynamically self-consistent theory has been developed to determine phase diagrams of binary crystalline polymer blends. The original Flory diluent theory, although captures the liquidus line, is unable to account for the solidus line due to the inherent assumption of complete immiscibility of solvent in the solid crystal. This over-simplification has led to the $\chi$ parameter obtained from the melting point depression curve to be at variance with the $\chi$ parameter by small-angle neutron scattering. The present theory takes into account all possible interactions such as amorphous-amorphous, crystal-amorphous, amorphous-crystal, and crystal-crystal interactions to predict various phase diagrams involving liquid-liquid, liquid-solid, and solid-solid coexistence regions bound by liquidus and solidus lines. It was found that the crystal-amorphous interaction is the major contributor to the melting point depression rather than the conventional Flory-Huggins $\chi$ parameter. However, in the limit of the complete insolubility of the solvent in the crystal phase, the original Flory diluent theory is recovered. In collaboration with Rushikesh Matkar, University of Akron.

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Thein Kyu
University of Akron

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