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**Morphological instabilities during the rapid solidification of three component systems** ANTHONY ALTIERI, STEPHEN DAVIS, PETER VOORHEES, Northwestern University — Rapidly solidifying binary mixtures of a major component and a dilute solute are known to be subject to morphological instabilities. The stability of ternary mixtures is not well understood. A linear stability analysis of ternary mixtures of one major component and two dilute solutes is performed. The growing cellular and oscillatory instabilities, present in binary systems, are investigated for ternary systems. The effect of thermal and concentration gradients, surface energy, interface kinetics, and nonequilibrium thermodynamics on the morphological instabilities, and the use of the second solute to stabilize the system, are considered.

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