

**Two-dimensional selection in dendritic growth of binary alloy  
by quantitative phase-field simulations**

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Contrary to the generally accepted mechanism of competitive dendritic growth that favorable oriented dendrites overgrow unfavorable oriented dendrites, recently an unexpected selection that unfavorable oriented dendrites overgrow favorable oriented dendrites is reported in both experimental and numerical studies. Although it is clarified that the dendritic space is the dominant factor for the unexpected selection, the effects of other factors such as anisotropy of interface energy are not investigated. In this study, we investigate factors that affect to the unexpected selection by performing two-dimensional directional solidification simulations. Here, we use a quantitative phase-field model for dilute binary alloy.

**Keywords:** Competitive dendritic growth, Directional solidification, Phase-field method