Dynamics of metastable limit in a ternary system

장지웅, 양대륙*
고려대학교
(dryang@korea.ac.kr*)

The purification of materials takes a high portion of the production cost in the semiconductor industry since the impurity causes serious defects of the products. To cut down the cost, the amounts of the impurities in the raw material and the usage of utilities such as de-ionized water for washing have to be reduced. If the supersaturation of the solution is larger than the maximum allowable supersaturation, ΔC_{max}, many nuclei formed in the solution. If the nucleation occurs throughout the crystal growth operation, the product size distribution will be wide spread-over. The purity of the product is degraded and the fine particles increase the pressure drop for washing process. To avoid the nuclei formation, the crystallization processes have to be maintained in the metastable region in which particles only grow without nuclei generation. Thus, it is very important to identify the metastable limit. In this paper, a material to synthesize the photo resist is used for studying the metastable limit behavior as a ternary system and the related parameters are evaluated. The model for metastable limit used in this study is a dynamic model with the cooling rate as the input. This model can predict the nucleation time under various operation conditions such as cooling scenarios, initial cooling temperature and cooling history.