Concentration Profile Simulation of Metastable Solvent Epitaxy

Hideki Ishii[1], Shigeto R. Nishitani [1], and Tadaaki Kaneko [2]

[1] *Department of Informatics, Kwansei Gakuin Univ., Gakuen 2-1, Sanda, 669-1337 Japan*

[2] *Department of Physics, Kwansei Gakuin Univ., Gakuen 2-1, Sanda, 669-1337 Japan*

In the Metastable Solvent Epitaxy(MSE) technique, the configuration of the system is the similar with the traveling solvent method. For such a system, the temperature field, the concentration field and the related phase diagram are key insights to understand or control the process correctly. In this research we will explore the concentration profile of this technique.

Due to thin zone of liquid solvent in MSE, the convection flow are assumed to be suppressed, and thus the main mechanism of the solvent transport is diffusion. For the simplicity, the solvent concentration of seed and feed is 0.5, and we assumed that the zone boundaries of liquid solvent, which attached to the feed and seed, are fixed; 0.1 for the seed and 0.2 for the feed respectively. The diffusion equation is solved numerically by the conventional Crank-Nicolson method. The simple mass conservation is included as well. The concentration profiles for the initial state and intermediate steady state will be easily estimated to be similar with those of uni-directional floating zone method. The relation of concentration profile with phase diagram is very important for the metastable solvent epitaxy technique, which will given in detail at the conference.