Some considerations on CVM, PPM and Phase Field Method

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The evolution of microstructure is one of the central problems in Materials Science. Recent development of Phase Field Method (PFM) enables one to reproduce the macrostructural pattern formation process. By a sufficient parametrization, it has been recognized that PFM can be applied to versatile phenomena.

Yet, PFM is a phenomenological approach and is by no means able to incorporate atomistic information. On the other hand, Cluster Variation Method (CVM) and Path Probability Method(PPM) have been applied to various problems of configurational thermodynamics and kinetics.

In the present study, we attempted to incorporate CVM free energy in the PFM and examined the resultant kinetic process. The comparison with PPM is also made.