Application of the equation for an unseeded crystallization

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　Many numerical solution for crystallization process has been developed due to the difficulty of the derivation of an analytical solution. The analytical equation of unseeded crystallizations has advantages such as fast calculation, understanding physicochemical relationship between parameters, over numerical equations. An analytical equation has been developed for unseeded crystallization precesses without aggregation and breakage. The equation includes the relationship between the size of crystal and the number of particles derived by the conservation of mass with nucleation and growth kinetics. The simulational results of the analytical solution on various conditions were conducted and compared with a numerical counterparts. The analytical equation allowed the evaluation of the kinetic parameter by measuring overall mass as a function of time. The equation of unseeded crystallization process is not limited to a specific material. Therefore, we applied the analytical equation to evaluated the kinetic parameters of crystallization process with various materials such as ionic, organic, and metallic materials.