Phase-field model of solute precipitation / dissolution

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**1. Dimensional equations**

Please see equation (24), (25) and (54) in Xu and Meakin, 2008, Phase-field modeling of solute precipitation and dissolution, The Journal of Chemical Physics, 129, 014705.

**2. Dimensionless equations**

Please see equation (12)-(14) in Xu and Meakin, 2011, Phase-field modeling of two-dimensional solute precipitation/dissolution: Solid fingers and diffusion-limited precipitation, The Journal of Chemical Physics, 129, 014705.

**3. Weak form for equations**

**3.1 Phase field equation**

Here are ACTimeDerivative, ACGrad, ACLoc, ACAdd kernels in both source and include code directory, respectively, except the boundary condition term which is not considered in this simulation.

Local free energy function

Curvature

Note: the code implementation is using second derivation directly (Laplacian term).

**3.2 Concentration equation**

Here are TimeDerivative, ConcDiffusion and ConcAdd kernels in both source and include code directory, respectively, except the boundary condition term which is not considered in this simulation.

**3.3 Random noise term**

*α* is the random noise amplitude; *n* is the random number between -1 and 1

Weak form