

Crystalline curvature flow of planar networks

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Abstract

We consider the evolution of a polycrystalline material with three or more phases, in presence of an even crystalline anisotropy. We analyze existence, uniqueness, regularity and stability of the flow. In particular, if the flow becomes unstable at a finite time, we prove that an additional segment (or even an arc) at the triple junction may develop in order to decrease the energy and make the flow stable at subsequent times. We discuss some examples of collapsing situations that lead to changes of topology, such as the collision of two triple junctions.