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Behaviour of dislocations near phase boundaries in the anisotropic linear elasticity theory

A.Ouchtati, O.Khalfallah

Abstract : The image force undergone by a matrix dislocations close and parallel to an interphase boundary is studied in Ag-X bicrystals with X : Pb, Cu and Ni for disorientations ranging between 0° and 90° . The elastic energy of dislocation boundary interaction is calculated within the framework of anisotropic linear elasticity. It is related to the difference of the two metals shear moduli. It is about a few hundred pico Joule per meter. The image force can be repulsive or attractive according to the sign and the intensity of shear moduli difference. The isoenergy maps have various symmetries according to the disorientation.

Keywords : Interphase Boundary, Dislocation, Elastic Interaction, Image Force, Anisotropic elasticity, FCC Structure.