< 발표 II-11>

Evaluation of Grain Boundary Misorientation Using Electron Diffraction Patterns and Maztrix Algebra

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The structure of grain boundary(GB) is an essential parameter in understanding properties of various advanced materials: GB sliding in superplastic deformation, mechanical strength of polycrystalline materials and electric/electronic properties of polycrystalline silicon, etc.

It is recently well recognized that GB has a periodic structure. That is, both grains across grain boundary has Coincidence Site Lattice(CLS) along the boundary. The density of CLS is dependent on GB misorientation. By evaluating misorientation parameters(angle and axis), it is thus possible to deduce the CLS structure of a GB.

In this research, we proposed an easy and accurate method to calculate misorientation and the CLS parameters of the GB by using Kikuchi diffraction patterns and matrix algebra. Misorientation parameters are determined from two sets of Kikuchi patterns of each grain via determining two beam directions in each grain coordinate. This method was applied in molybdenum and 304 stainless steel and the CLS model of the GB was verified in conjunctions with the interaction between GB and dislocation movements.

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