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東京大学微細構造解析プラットフォーム
公開講演会

Singular Structures of Preferred Interfaces Generated from Precipitation Reactions

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Quantitative descriptions of interfaces in crystalline materials are essential for a full understanding and realistic modeling of microstructure. The reproducible preferred interfaces (i.e., the habit planes or broad facets) generated during a precipitation reaction often have full (five) degrees of freedom to develop. They are generally flat at a scale of tens to hundreds nano meters, but may not be flat at the atomic scale. It is conceivable that these stable interfaces are a singular interfaces associated with local minima (singularity) of interfacial energy with respect to variation of not only interface orientation but also orientation relationship (OR) between the precipitates and matrix. However, few energy data are available from measurements or calculations to identify energy singularity in heterophase systems. To bypass this difficulty, we have proposed to utilize singularity in the structure feature as a signature of singular interfaces. In this presentation, we will show how to identify singular interfaces in terms of singularity in interfacial dislocations, in good matching sites density, or in periodicity of their patterns. The structural singularity must be permitted by discrete interface geometry in five dimensions. Using the singularity condition, one is able to quantitatively explain the preferred interfaces, and possibly predict potential preferred interface(s). The methods for calculations will be explained. Numerous observations from various alloys will be demonstrated on the structural singularity in preferred interfaces.

Main meeting room at Institute of Engineering Innovation

工学部総合研究機構９号館１階　大会議室

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