Controlling Physical Properties of Crystalline Materials

2 units (selection)

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Target〉 Geometrical theories of grain boundary character in polycrystalline materials are described. Various methods to describe textures are also introduced.

Outline〉 Various geometric theories of grain boundaries and textures are introduced.

Style〉 Portfolio

Keyword〉 ***grain boundary, geometrical theory, texture***

Fundamental Lecture〉 "**Material Applications**"(1.0)

Notice〉 2-hour study before and after each lecture is necessary.

Goal〉

1. CSL theory of geometrical character of grain boundaries must be understood.
2. Various methods to describe textures must be understood.

Schedule〉

1. Dislocation theory of small angle grain boundaries
2. Dislocation theory of general boundaries
3. Extension of geometrical theory to interphase interfaces
4. O-lattice theory
5. CSL theory
6. Calculation of grain boundary dislocations
7. Miller indices and stereographic projection
8. Pole figure and inverse pole figure
9. Euler angles to describe crystallographic orientation
10. Orientation distribution function
11. Experimental analysis of textures
12. Deformed textures
13. Recrystallized textures
14. Textures and physical properties 1
15. Textures and physical properties 2

Evaluation Criteria〉 Evaluation is based on term papers.

Reference〉

◇ Forwood and Clarebrough: Electron Microscopy of Interfaces in Metals and Alloys (Adam Hilger)
◇ Randle: Microstructure Determination and its Applications (The Institute of Materials)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216635

Contact〉

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