日本金属学会九州支部・日本鉄鋼協会九州支部

第 250 回材料科学談話会のお知らせ

平成21年11月10日

元東北大学の渡邊 忠雄 先生をお招きして、下記のように講演会を開催いたします。
皆様、奮ってご参加下さい。

講　　師：　**渡邊　忠雄**　先生

（(元)東北大学大学院工学研究科・教授，中国東北大学・名誉教授）

講演題目：　**Where has Grain Boundary Engineering come from, and Where will it go?**

日　　時：　平成21年11月25日（水）　13時00～14時30分

会　　場：　熊本大学工学部2号館2階　222教室

http://www.kumamoto-u.ac.jp/daigakujouhou/campusjouhou/shuyou_shisetsu/map_kurokami_2.html

要　　旨：別紙参照

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交通手段の詳細や談話会についてのお問い合わせは、下記の連絡先にお願いいたします。

材料科学談話会世話人：　中島　英治

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Special Lecture on Grain Boundary Engineering

(at Kumamoto University, 25 November, 2009)

"Where has Grain Boundary Engineering come from, and Where will it go ?

Tadao Watanabe

Visiting professor, Key Laboratory of Texture and Anisotropy of Materials, Northeastern University, Shenyang, China, formerly with Tohoku University, Sendai, Japan, presently staying at Indian Institute of Science (IISc), Bangalore, India.

Abstract of Lecture:

Firstly, a historical background of the advent of the concept of Grain Boundary Engineering (GBE) which was proposed by the speaker in 1980s [1] and more recently has been drawing an increasing attention of many scientists and researchers involving in the development of advanced structural and functional materials, will be given. Importance of basic knowledge of the characterization of grain boundaries and structure-dependent grain boundary properties will be discussed in connection with experimental techniques for the characterization and the effects of grain boundary structure on mechanical, physicochemical and electrical properties of grain boundary properties, particularly obtained by bicrystal experiments for metals, semiconductors and ceramics. New important microstructural factors first introduced by the speaker, i.e. the grain boundary character distribution (GBCD) and the boundary connectivity, are discussed which play an important role to bridge a gap between structure-dependent boundary property of individual boundaries and bulk properties of a polycrystalline material as basic knowledge of GBE.

Recent successful achievements of GBE for structural materials are shown, focusing on the control of different types of grain boundary fracture which cause severe brittleness and poor ductility in polycrystalline structural materials [2], more evidently for nanostructured smaterials. The possibility of improvement of performance in functional materials is also discussed taking some examples from recent studies of shape-memory alloys, electroceramics and photovoltaic polysilicon. Finally, a new challenge of GBE by magnetic field application is discussed which may have a high potential for future development of GBE for both structural and functional materials, as demonstrated in recent reviews [3,4].

[1]. T. Watanabe: Res Mechanica, **11** (1984), 47-84.

[2]. T. Watanabe and S. Tsurekawa: Acta Mater., **20** (1999), 4171-4185.

[3]. T. Watanabe, S. Tsurekawa, X. Zhao, L. Zuo and C. Esling; J. Mater. Sci., **41** (2006),7747-7759.

[4]. T. Watanabe, S. Tsurekawa, X. Zhao and L. Zuo: Scripta Mater., **54** (2006), 969-975.