日本金属学会九州支部・日本鉄鋼協会九州支部

第 291 回材料科学談話会のお知らせ

平成25年2月12日

東北大学の 吉見 享祐　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：**吉見　享祐**　先生（**東北大学　准教授**）

講演題目：**Strength Anomaly of B2-type FeAl**

日　　時：　平成 25 年 2 月 28 日(木)10 時 20 分～11 時 50 分

会　　場：　熊本大学工学部研究棟Ⅰ3 階　308 教室

要　　旨：In this lecture, physical, elastic and plastic properties of B2-type FeAl are overviewed, and the positive temperature dependence of yield strength is reconsidered with our updated results. FeAl is one of well-known B2-type intermetallic compounds, which has been studied for structural applications for decades. On the other hand, its fundamental properties such as physical, elastic and plastic properties still have some unsolved issues, and thereby the compound has attracted great interests from the viewpoints not only of engineering but also of solid-state physics. One of hot topics on the mechanical properties of FeAl is the positive temperature dependence of yield strength, so-called the 'strength anomaly', which was firstly reported in 1991. Unfortunately, the strengthening mechanism responsible for the anomaly such like the Kear-Wilsdorf (K-W) locking has not been established and is still open for argument. Recently, there is a trend to interpret the strength anomaly with the 'vacancy-strengthening' mechanism. As well known, FeAl has a large amount of thermal vacancies at elevated temperature. The thermal vacancies are easily frozen under supersaturation by quenching and the excess vacancies significantly harden FeAl. The idea of the vacancy-strengthening mechanism for the strength anomaly is based on the excess vacancy hardening behavior. However, it has not been understood how excess vacancies harden FeAl. Chang et al. claimed that the excess vacancy hardening is a kind of solid-solution hardening, but it has been unclear how the vacancies behave as a solid-solution element. In our recent study, it was found that the lattice parameter and elastic moduli of FeAl in the temperature range of the strength anomaly are not affected by thermal vacancies. This fact suggests that thermal vacancies do not contribute to the solid-solution hardening. A direct interaction model between vacancy and dislocation should be taken into account for the strengthening mechanism of FeAl.

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