

ICC-IMR セミナー

7月21日(水) (July 21, Wednesday) 10:00 -
3号館6階セミナー室 (seminar room, 3-601)

現在 ICC-IMR 客員教授として滞在中のフランス国立応用科学研究所 (INSA) のエピシエ教授に鉄鋼中の窒化物の析出挙動に関してご講演していただきます。また金研側からも古原教授に同様のご研究に関してご講演していただき、有益な意見交換・国際交流の場にしたいと思っております。特に材料系の先生方・学生のみなさんの多数のご参加をお待ちしております。

Electron Microscopy study of carbo-nitrides precipitation in steels

Dr. Thierry Epicier

Director of Electron Microscopy group, INSA, Lyon, France

Microalloying elements are frequently used (e.g. vanadium, niobium, titanium?) to improve mechanical properties of high performance steels. During appropriate thermomechanical treatments these elements lead to a fine precipitation of carbonitrides, with two beneficial roles: (i) grain growth control at high temperatures, (ii) structural hardening. Both "metal" and "microscopy" research groups at MATEIS lab. (INSA-Lyon, F) have been working since a few years in order to establish the correlations between the precipitate state and the mechanical properties.

The present contribution will mainly focus on Electron Microscopy observations aiming at fully characterizing the precipitates distribution, chemical nature and volume fraction by means of various techniques (from STEM in a SEM, HRTEM, HAADF-STEM, EDX and EELS) on both extraction replicas and thin foils.

Nano-scale Analysis of Precipitation in Nitrided Steels

Prof. Tadashi Furuhashi

Institute for Materials Research, Tohoku University

Microstructure formed during nitriding of steels is a quite complex phenomena because precipitation of fine alloy nitrides occurs in a chemically inhomogeneous matrix under continuous supply of nitrogen from the surface. In this presentation, the precipitation behaviors of nano-sized nitrides in various ferritic alloys are discussed based on the results of advanced analysis in atomic scale utilizing HREM and 3DAP.

In the alloys containing strong nitride forming elements, precipitation of metastable nitrides occurs. Particularly, phase separation in ferrite is enhanced by strong interaction between the element such as Ti or V and nitrogen, resulting in uniform and fine dispersion of G.P zone like metastable clusters. Transition of those metastable phases to stable nitrides takes place gradually during further nitriding. Presence of excess nitrogen in ferrite is also recognized which might contribute to hardening by nitriding partly.

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