DE LA RECHERCHE À L'INDUSTRIE

cea

Séminaire

SRMP

Lundi 10 septembre 2012 14h

Salle de réunion du SRMP – Bâtiment 520 - Pièce 109

Detection of Point-Defect Dynamics in Metals using High-Voltage Electron Microscopy

Kazuto ARAKAWA

Department of Materials Science
Faculty of Science and Engineering
Shimane University, Japan

High-voltage electron microscopy (HVEM) is a powerful technique to study elementary processes of radiation damage in metals. Remarkable advantages of HVEM are as follows: (i) HVEM enables the formation of lattice defects upon high-energy electron irradiation in a controlled manner and simultaneous observation of the behaviors of defects. (ii) Defects generated in the primary damage process upon high-energy electron irradiation are almost only single point defects (self-interstitial atom (SIA) and vacancy), unlike the cases for ion and neutron irradiations where point-defect clusters are directly formed via the collision cascade. By utilizing these features of HVEM, dynamic behaviors of *visible* defects can be directly examined; furthermore, properties of even *invisible* single point defects can be also extracted.

We are now trying to make precise estimation of parameters related to dynamics of SIAs, such as activation energy for their migration, dimensionality of their migration (3D or 1D), and the values of the radius for their reactions with other defects, by the combination of precise observation of the formation processes of dislocation loops under high-energy electron irradiation and kinetic Monte Carlo simulation. In addition, a study to extract properties of vacancies by the observation of their clustering processes is under the progress. In this talk, I will present some results of these studies.

Les visiteurs de nationalité étrangère hors Union Européenne sont priés de bien vouloir avertir impérativement 3 semaines à l'avance, et ceux de l'Union Européenne 1 ou 2 jours avant le séminaire, le Secrétariat du Service de leur entrée sur le Centre : Tel : 01 69 08 66 64 - Fax : 01 69 08 68 67.

Commissariat à l'énergie atomique et aux énergies alternatives
DEN/DANS/DMN Service de Recherches de Métallurgie Physique
Centre de Saclay – Bât. 520 - 91191 Gif-sur-Yvette Cedex – France

Séminaires - Martine Logé ☎ 01 69 08 51 67 et Fabien Bruneval ☎ 01 69 08 43 49