

実験報告書様式(一般利用課題・成果公開利用)

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課題番号 Project No. <b>2011B0061</b> 実験課題名 Title of experiment Observation of Hydrogen Trapping Site in Steel using Small-Angle Neutron and X-ray Scattering 実験責任者名 Name of principal investigator Masato OHNUMA 所属 Affiliation National Institute for Materials Science	装置責任者 Name of responsible person Jun-ichi Suzuki 装置名 Name of Instrument/(BL No.) TAIKAN 実施日時 Date and time of Experiment 2012/3/19 ~ 2012/3/21

試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。(適宜、図表添付のこと)  
 Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form. Steel with the composition of SCM440 (0.39C-0.17Si-0.62Mn) with different V contents and different heat treatments. In total 8 samples.
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2. 実験方法及び結果 (実験がうまくいかなかった場合、その理由を記述してください。) Experimental method and results. If you failed to conduct experiment as planned, please describe reasons. This is the very first experiments of steels using TAIKAN. Thus the first purpose is to be familiar with the experiments using multi-wavelength experiments. For the steel sample measurements with bcc structure, applying magnetic field is the essential requirement. Because the electric magnet was not installed at the time, we used NdFeB Halbach type permanent magnet. Figure 1(a) shows the SANS profiles of TP2 (0.5V, slow cooling down to 900C and oil queched) parallel and perpendicular to the magnetic field. As clearly shown here, separation of magnetic and nuclear component was accomplished by this system. Hydrogen were charged into some of the steel samples, electrochemically. All charged samples measured twice. The first measurement was conducted just after taking out from LN2. After the first measurements, the samples were annealed around 150C using hot-plate for desorption of hydrogen. Then, those samples were measured and compare to the first measurement. Figure 1(b) shows the profiles of TP3 (tempered at 600C) perpendicular to the magnetiic field before and after desorption treatment. No clear difference were observed in this q-range. In figure 1, we used SANS profiles only using 7.0 to 7.8 A range. At the time, summing up all the contribution after collecting wavelength intensity collection was required manual treatment. We hope that the good software will
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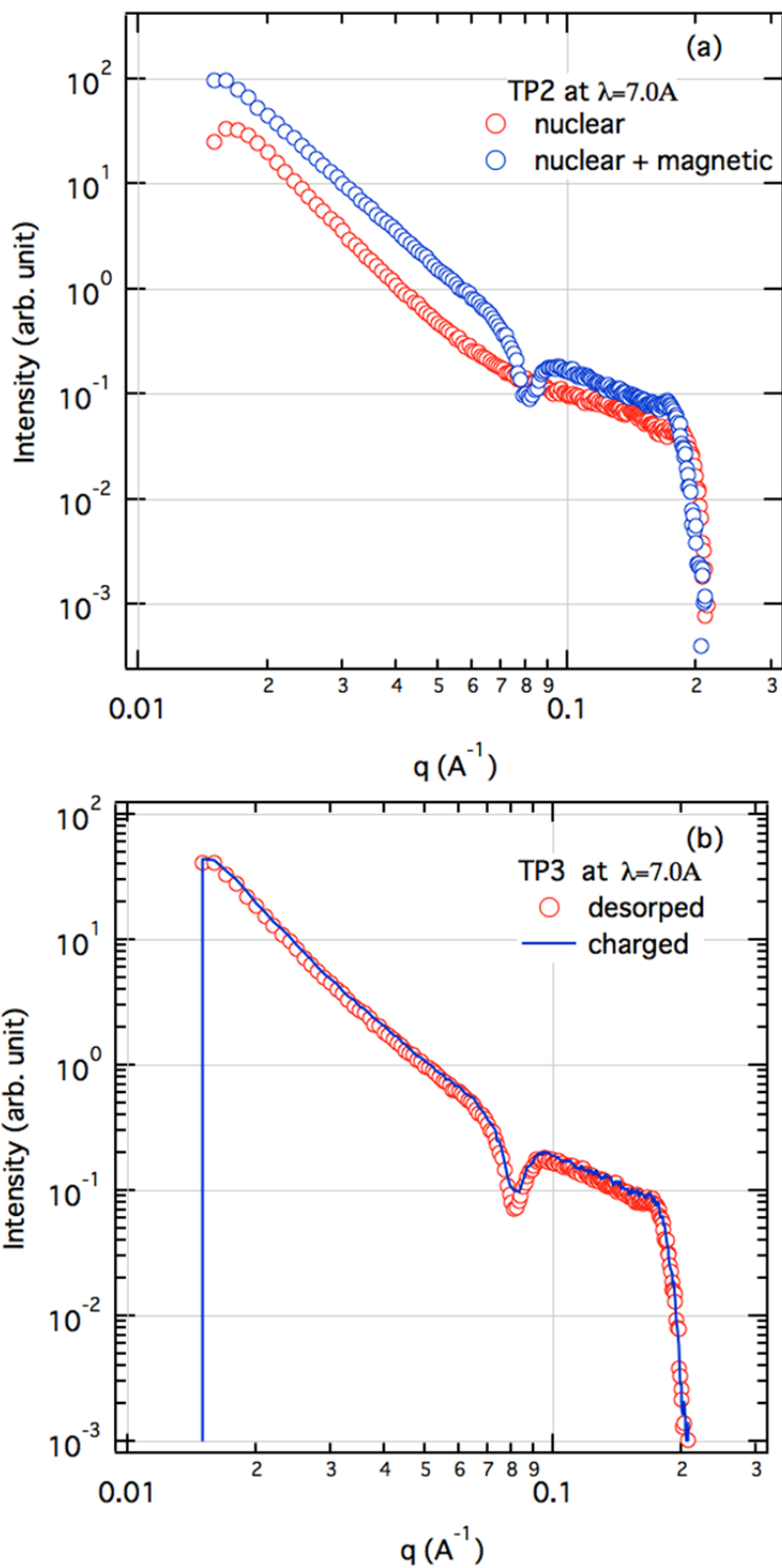


Figure 1 SANS profiles of steels with different heat treatment, (a) quenched into oil bath, (b) tempered at 600C, profiles taken from perpendicular direction to magnetic field.