MLF Experimental Report	提出日 Date of report
実験課題番号 Project No. 2014P0602 実験課題名 Title of experiment Improvement of Crystalline Structural Information Imaging Techniques with Engineering Materials Diffractometer 実験責任者名 Name of principal investigator Yoshiaki Kiyanagi 所属 Affiliation Nagoya University	装置責任者 Name of responsible person K. Aizawa 装置名 Name of Instrument/（BL No.） BL19 TAKUMI 利用期間 Dates of experiments 2014/11/17～12/2

1．研究成果概要（試料の名称、組成、物理的・化学的性状を明記するとともに、実験方法、利用の結果得られた主なデータ、考察、結論、図表等を記述してください。

Outline of experimental results (experimental method and results should be reported including sample information such as composition, physical and/or chemical characteristics.

1 . Name of sample(s) and chemical formula, or compositions including physical form.

Al (bulk)

$Al_{0.98}Ni_{0.02}$ (bulk)

2. Experimental method and results.

Al and Al-Ni alloys were taken by neutron diffraction and Bragg-edge transmission combined with during tensile test. These alloys were worked plastically by ECAP (eqal-channel-angular-pressing). Texture of the alloys and stress-strain curve was changed drastically after ECAP. The maximum tensile strength increased, while the elongation decreased after ECAP. In order to clarify the change of mechanical property during tensile test, neutron diffraction and transmission experiments were carried out by using BL19. It is important to estimate the lattice strain by diffraction and the texture observation by transmission.

Fig. 1, 2 show the diffraction profiles of North bank and South bank data. North bank data indicate constriction along the sample thickness direction. South bank is elongation along the tensile direction. The 200 reflection peak is clearly larger than the 100 reflection in both North and South bank data, which shows the texture exists in the sample.

1．研究成果概要（つづき） Outline of experimental results (continued).

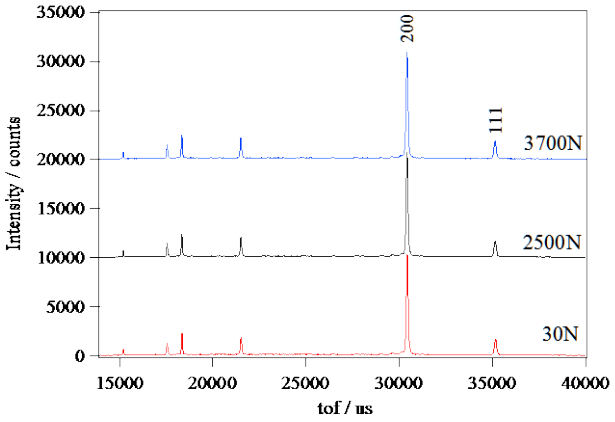

Fig. 1 Diffraction profile of North bank.

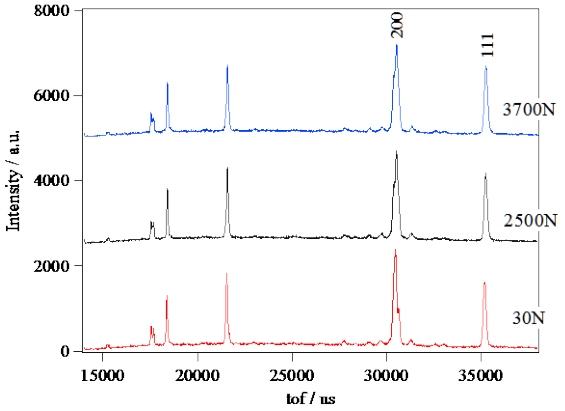

Fig. 2 Diffraction profile of South bank.

Fig. 3 shows the Bragg-edge transmission spectrum of Al-Ni alloy during tensile test. The Bragg-edge of Al-Ni alloy with fcc structure was clearly observed. The 111 Bragg-edge height decreased with increasing load, while that of 200 edge increased with increasing load. Bragg-edge profile shape depends on the texture. The texture along the sample thickness direction was changed with increasing load. The elastic region is under 2000N and the plastic region is around 3500N. It is interesting to understand the difference of texture between the elastic region and the plastic region. Texture analysis are under way by RITS.

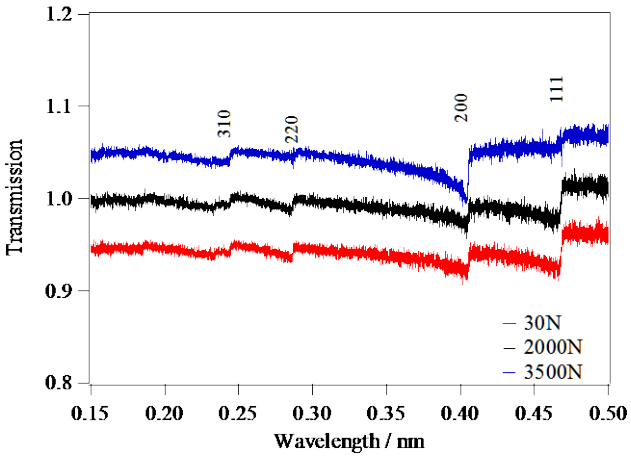

Fig. 3 Bragg-edge spectrum.

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