 MLF Experimental Report	提出日 Date of Report 2016/8/8
課題番号 Project No. 2013B0255 実験課題名 Title of experiment Internal investigation of a Cd sample with resonance absorption imaging 実験責任者名 Name of principal investigator Masahide Harada 所属 Affiliation Japan Atomic Energy Agency	装置責任者 Name of responsible person Oikawa Kenichi 装置名 Name of Instrument/(BL No.) NOBORU / BL10 実施日 Date of Experiment 2014/3/27 - 2014/3/29

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.
A Cadmium (Cd) plate sample canned by an Aluminum (Al) alloy.

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.
<p>Figure 1 shows a picture of the failed canned Cd plate used as the sample. The sample sizes of the Cd plate and the Al alloy can were 100 x 100 x 2 mm³ and 120 x 120 x 20 mm³, respectively. In this experiment, the neutron transmission imaging method was adopted to observe an inside of the sample. The neutron energy-dependent and position-dependent imaging data with and without the sample were measured and the transmission data were converted from these data. The micro-pixel chamber (μPIC) with 0.1 mm in spatial resolution, 1 μsec in time resolution and 100 kcps in the maximum acceptable count rate was used as a two-dimensional neutron detector. The sample and the detector were located at 14 m and 14.5 m from the moderator, respectively. A Lead filter was used to eliminate flash gamma-rays from the moderator. A rotary collimator with a collimator hole of 3.2 x 3.2 mm² was also used to obtain high spatial resolution. Irradiated area of neutrons at the sample position was limited to be 50 x 50 mm² due to suppressing the count rate and the measurement data size. As shown in the fig 1, the sample was previously divided to 4 pieces (AC-1 ~ 4) in order to adapt to the limited irradiation field size (50 x 50 mm²) and the each piece was individually measured.</p>
<p>Figure 2 shows measured Cd thickness of the failed canned Cd plate in the experiment. The Cd thickness was derived from the transmission data and the Cd cross section data. From the result, it was found that the Cd thickness (amount) was almost uniform and a small vacancy (circle shape with 5 mm in diameter) was existed. Note that, though the ultra-sonic transmission imaging of the sample was also measured, the small vacancy detected by the neutron transmission imaging couldn't be found by the ultra-sonic transmission.</p>

2. 実験方法及び結果(つづき) Experimental method and results (continued)

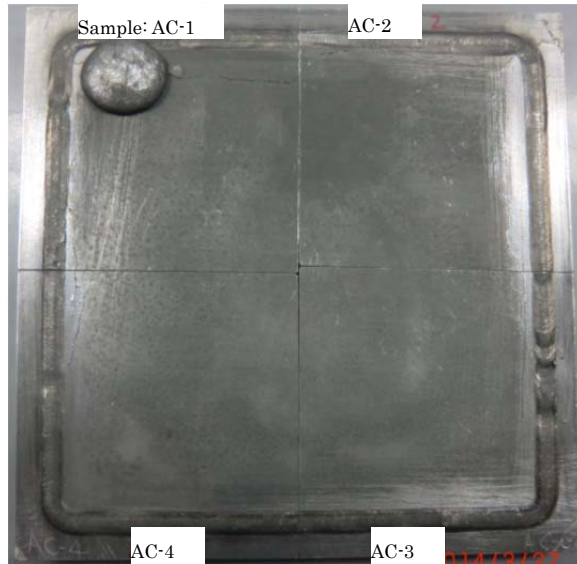


Fig.1 Picture of the Cd sample canned by Aluminum alloy.

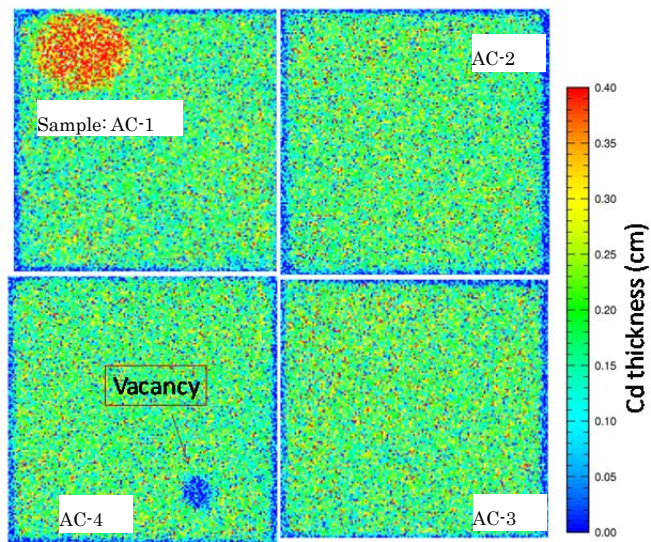


Fig.2 The Cd thickness distribution measured by neutron transmission imaging in the sample
The direction in this figure is same as that in the fig.1.