MLF Experimental Report	提出日 Date of Report
課題番号 Project No. 2015A0224 実験課題名 Title of experiment Measurement of neutron capture cross section of Tc-99 実験責任者名 Name of principal investigator Tatsuya Katabuchi 所属 Affiliation Tokyo Institute of Technology	装置責任者 Name of responsible person Yosuke Toh 装置名 Name of Instrument/（BL No.） ANNRI/ BL-04 実施日 Date of Experiment 2016/2/29 - 2016/3/6

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.

- Technetium-99, 6.3 mm diameter, 0.3 mm thick , 78 mg
- Gold, Au, 10 mm diameter, 0.1 mm thick
- Boron, B, 10 mm diameter, 0.05g
- Carbon, C, 10 mm diameter, 73 mg

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.

The neutron capture cross section of Tc-99 was measured with the NaI(Tl) detectors of ANNRI. The sample was placed at the sample position with a neutron flight length of 27.9 m from the J-PARC spallation neutron source. Capture gamma-rays emitted from the sample were detected with the NaI(Tl) detectors at 90 and 125 degrees with respect to the neutron beam axis. Time-of-flight and pulse height of the detected events were recorded with the time digitizer and the pulse-height analyzer. To determine the incident neutron flux, measurement with a boron sample was made. The relative neutron flux was determined as a function of the neutron energy by detecting 478 keV gamma-rays from the $^{10}B(n,\alpha)^{7}Li$ reaction. Absolute flux was determined from a saturated resonance of the $^{99}Tc(n,\gamma)^{100}Tc$ reaction at 5.6 eV.

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

The pulse-height weighting technique was applied to deduce the neutron capture yield from pulse height spectra. The weighting function was calculated from detector response functions simulated by the Monte Carlo method. Dead-time correction was made. Backgrounds of low-energy overlapping neutrons, blank and scattering neutrons were subtracted. The correction factors of self-shielding and multiple scattering of neutrons in the samples were calculated with the Monte Carlo simulation. We determined the neutron capture cross section of ^{99}Tc in a wide range of neutron energy.