Contribution ID: **45** Type: **not specified**

Development of Neutron Activation Method Using UV Curable Resin Scintillator/紫外線硬化型シンチレーターを用いた中性子放射化法の研究

Thursday, 14 November 2024 16:00 (2 hours)

Strontium-88, which has a neutron magic number of 50, is important in s-process nucleosynthesis because it acts as a bottleneck in the s-process reaction network due to the small (n, γ) cross section. Therefore, the neutron captures cross sections need to be known with high precision for the reliable determination of the s-process abundances. However, there is disagreement between previous experiments. The Maxwellian-averaged neutron capture cross section at 30 keV was 6.13 ± 0.18 mb in Ref. [1] while 5.46 ± 0.45 in Ref. [2]. The two measurements were conducted with different methods: neutron activation method for Ref. [1] and time-of-flight (TOF) method for Ref. [2]. In general, the activation method is a well-established method but the measurement in Ref. [1] is different from the traditional activation method, in which γ-rays from the activated sample are counted with a Ge detector after irradiation. They detected electrons from β-decay with semiconductor detectors because the activated product ^{89}Sr ($T_{1/2}$ = 50.5 days) does not emit γ-rays in the β-decay process. Although the β-ray spectrum was not shown in Ref. [1], the result may suffer from low signal-to-background ratio due to the low counting rate, causing overestimation of the cross section. Thus, the purpose of the present study is to improve the neutron activation analysis with a larger detector efficiency achieved by the plastic scintillator made of UV curable resin. The experimental plan and preliminary results will be presented in the presentation.

References

[1] F. Käppeler et al., Astrophys. J. **355**, 348 (1990).
[2] T. Katabuchi et al., Phys. Rev. C. 108. 10.1103 (2023).

Primary author: SHAO, Zefeng (Institute of Science Tokyo/東京科学大学)

Co-author: KATABUCHI/片渕, Tatsuya/竜也 (Institute of Science Tokyo/東京科学大学)

Presenter: SHAO, Zefeng (Institute of Science Tokyo/東京科学大学)

Session Classification: Poster presentation/ポスターセッション