RCNP EXPERIMENT E298

PROPOSAL FOR EXPERIMENT AT RCNP

TITLE: Measurement of high-energy neutron cross sections for cosmic ray produced nuclides.

SPOKESPERSON:

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EXPERIMENTAL GROUP:

Full Name	Institution	Title or Position
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Kazuhisa Komura	Low Level Radioactivity Lab., Kanazawa University	Professor
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Keiji Nakashima	Dept. of Chemistry, Osaka University	Grad. Student
Kazuhiro Ooe	Dept. of Chemistry, Osaka University	Grad. Student

RUNNING TIME:	Installation time without beam	1 day (for each beam time)
	Development of device	
	Data (target bombardments)	3 days
BEAM LINE:		Neutron Experimental Hall
BEAM REQUIREMENTS:	Type of particle	p, n
	Beam energy	200, 300, and 400 MeV
	Beam intensity	$2\mu A$
	Any other requirements	
BUDGET:	Li target	50,000 yen

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SUMMARY OF THE PROPOSAL

Cosmic-ray-produced (cosmogenic) nuclides are used to reconstruct the evolutionary history of solar system ma-terials, including earth and planetary surface materials, and to study the history of cosmic rays. Monte Carlo neu-tron transport codes are essential tools in the reconstruction of cosmic ray exposure scenarios. However, even if the fundamental physics of neutron transport within planetary materials is modeled properly, the reliability of the results is still limited by the lack of or the accuracy of measured pertinent cross sections. At the present time, the largest uncertainty in reconstructing cosmic ray exposure scenarios is the uncertainty in the high-energy excitation func-tions for the nuclear reactions of interest because very few cross sections for reactions induced by high-energy neu-trons have been measured. We propose to measure the neutron excitation functions primarily to improve our under-standing of cosmic ray interactions for geochemical applications but they will also be used in cosmochemical, and astrophysical applications. We will expose target materials to neutron beams at the Neutron Experimental Hall and measure products by AMS (accelerator mass spectrometry) and low-level gamma-ray counting.