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KOREAN PROGRESS REPORT TO THE INDC

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Compiled by

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KOREAN NUCLEAR DATA CENTRE

ATOMIC ENERGY RESEARCH INSTITUTE

Seoul, Korea.

PROGRESS REPORT ON NUCLEAR DATA PROGRAMME OF A.E.R.I.

by

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(1) CURRENT STATUS

After establishment of Korean Nuclear Data Centre at Physics Division, A.E.R.I. in 1970, several members including a liaison officer have been engaged in the works of collection and classification of nuclear data, neutron cross-section sets and processing codes etc.

At present efforts are paid more on the collection of neutron data and generating group constants which are necessary for fast critical assembly design than the evaluation of nuclear data or cross-section measurements.

However during the year 1970, the following experiments were carried out by our research members:

- (a) Total Cross Sections of ^{45}Sc , ^{47}Ti , ^{49}Ti , ^{53}Cr and ^{61}Ni in the keV Region

A research staff of physics division, Mr. M.Cho, was sent to Karlsruhe to gain experiences in cross-section measurements in keV region. During his staying in Germany above mentioned measurements were carried out with the collaboration of Karlsruhe staffs and the results were presented to the 2nd International Conference on Nuclear Data for Reactors at Helsinki, 1970. (Proc. of 2nd Int. Conf. on Nuclear Data for Reactors at Helsinki, vol. 1, p.p. 619, 1970)

(b) Phonon Excitations in Titanium Hydride and Deutride by Low Energy Neutrons (Y.J.Lee and H.D.Kang)

A newly constructed twin crystal neutron monochromator installed at the tangential beam tube of TRIGA MARK -II reactor was used to measure the energy dependence of the neutron cross-section of hydrogen and deuterium bound in titanium metal lattice.

Titanium hydride and deuteride were prepared by diffusion method.

Total cross-section was calculated from the observed transmission for titanium dihydride powder sample as a function of neutron energy between 0.05 eV and 0.22 eV. A cross-section minimum was observed at the neutron energy of 0.122 ± 0.005 eV which corresponds to the threshold energy of phonon excitation.

A cross-section minimum of titanium deutride occurs at 0.145 eV of neutron energy and this value can also be taken as the threshold energy of phonon excitation of the optical level in the titanium lattice.

A more refined experiment is now being undertaken in the same laboratory.

(c) Radiative Capture Spectroscopy (M.K.Chung et al.)

For precise analysis of complex gamma-ray spectra due to thermal neutron radiative capture, a single flat crystal monochromator in combination with a Ge(Li) diode detector was constructed and is now under test. And semi-empirical approach was tried to determine full-peak detection efficiency of Ge(Li) detector and gave excellent agreement with observed data.

(2) FACILITIES AVAILABLE FOR NEUTRON PHYSICS EXPERIMENTS

The following facilities have been used for neutron physics experiments.

- (i) A twin crystal neutron monochromator
- (ii) Two sets of double axis neutron monochromator spectrometers
- (iii) Two slow choppers
- (iv) A rotating crystal spectrometer is nearly at completion of construction
- (v) 14 MeV neutron generator

Almost all the experiments in the field of neutron physics were performed by utilizing TRIGA MARK 11 (250 KW). However due to the insufficient usable neutron flux from TRIGA MARK 11, TRIGA MARK 111 (2 MW) reactor is under construction to fulfill the required flux and will be critical toward the end of 1971.

(3) FACILITIES PLANNED

- (i) Installation of a 5.5 MeV Van de Graaff is planned and its construction will start at the beginning of 1972 after the final approval for budget by a government authority.
- (ii) A small scale fast critical facility will be designed and constructed thoroughly by our research staffs. This project will start in 1972 and will end in 1976. The characteristics of our FCA will be almost the same as the critical facility which is now under construction at BARC in Trombay.

For this project compilation of cross-section data, group constant sets and related processing codes were already started at A.E.R.I.

(4) DATA REQUEST

We already requested evaluated microscopic cross-section data on several nuclides including ^{239}Pu in the form of magnetic tape to INDC and waiting for its delivery.