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INDC INTERNATIONAL NUCLEAR DATA COMMITTEE

Progress Report on Nuclear Data Activities in Viet Nam

1983/84

Hoang Dac Luc

Institute of Physics of the Academy of Sciences
Hanoi, Viet Nam

This work was carried out under IAEA research contract no. 3515/RB
within the framework of the Interregional Project INT/1/018

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PROGRESS REPORT

INDC-08-12

a/ 1.Contract number 3515/RB

2.Title of Project Measurement and analysis of neutron activation cross-sections around 14 MeV (work to be performed under the cooperative research programme on measurement and analysis of 14 MeV neutron nuclear data needed for fission and fusion reactor technology)

3.Institute where research is being carried out :Institute of Physics of the Academy of Sciences.

4- Chief scientific investigator: Dr.HOANG DAC LUC

5- Time period covered : Nov.1983-May1984

b/Description of research carried out.

1-Measurement of total and photopeak efficiency curves of the 62 cm^3 high purity germanium detector from ORTEC using :

-Single line gamma ray sources Co 57,Ce 139,Cs 137,Mn 54,Zn 65, Na 22

-Multiple line source Ba-129m prepared by irradiating a natural Ba sample on the Hanoi microtron MT-17 .Source geometry is disk shape, Ø 2 cm.Ba-129m has short half-life (2.13 H) so we measured first in 'far' geometry then in 'close' one.

The measured values were corrected by dead time loss, pile up loss, summing coincidence losses and calculated by PDP-11 computer.The result is a table of photopeak efficiencies from 1 00 keV to 2000 keV changed by steps of 10 keV

2- Measurement of the (n,p) cross-section on Cr 52 induced by 14 MeV neutrons.

Target: disk shape Ø 2cm
thickness 547.5 mg/cm^2
chemical form :high purity (99.5°/o) $K_2 Cr_2 O_7$

Reference reaction: $^{27}Al(n,p)^{27}Mg$, cross-section 75± 6 mb

Neutron energy: 14.7+0.1 MeV

Neutron flux monitoring:
Fast neutron scintillation detector coupled with MCA (ND-66B,Nuclear Data) in multiscaling mode.Neutron flux variation with time was corrected by a BASIC programme on ND-66B

Detector :high purity Ge,62 cm^3 ,the energy resolution is 2.1 keV at 1332 keV (Co 60)

Dead time correction,random and true coincidences were taken into account.

The contribution of $^{53}Cr(n,np+pn)^{52}V$ reaction was taken into account using cross-section value given by Qaim (1_) : 12± 3 mb

The following standard deviations were taken into account in calculating accuracy:

-Reference cross-section value
-Peak area (sample and reference)
-~~Half-life of sample and reference~~ -detector efficiencies

The gamma peak from ^{52}V used for measurement was 1443 keV (T1/2 3.755 mn)

Result obtained: 65±10 mb

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3- C.M.Lederer,V.S.Shirley,Table of Isotopes,7 th edition,1978, John-Wiley Sons Inc.
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