

Subgroup 8

Minor Actinide Data (^{237}Np and ^{241}Am)

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This subgroup was organized in order to investigate the present status of evaluated nuclear data for minor actinides. For the first phase, we selected the data of ^{237}Np and ^{241}Am to be investigated. Comparison of existing evaluated data was made at JAERI. For both nuclei, the evaluated data are given in ENDF/B-VI, JEF-2 and JENDL-3. They were compared with each other and with experimental data. Then, the large discrepancies were found in the following quantities:

1) ^{237}Np fission cross section

The evaluated data in the energy range below 5 keV are discrepant from the recent experimental data measured at Kyoto university, Japan. All evaluated data are based on the data measured at Saclay (Plattard, 1976) and ignore large cross sections measured with an underground nuclear explosion. However, the data of Kyoto university support the large cross sections.

2) $^{237}\text{Np}(n,2n)$ reaction cross section

This cross section is important for estimation of ^{232}U production. However discrepancies were found among evaluations, in particular between JEF-2 and other two.

3) inelastic scattering cross sections of the both nuclei

No experimental data are available for the nuclear data evaluation work. Therefore, discrepancies are inevitable.

4) ν (number of neutrons per fission) of the both nuclei

It is interesting to make integral tests for these discrepancies, and is important to make some suggestions for improvement of the evaluated data. In order to go to the integral test phase, a coordinator of this subgroup has been changed to Hideki Takano who is very familiar with this kind of benchmark calculations. He will make a plan for the benchmark tests of the current evaluated nuclear data.

The intercomparison of evaluated data, on the other hand, can be made in parallel with the integral tests. This work will be made at JAERI in 1993. The next candidates of the intercomparison are ^{238}Pu and ^{243}Am .

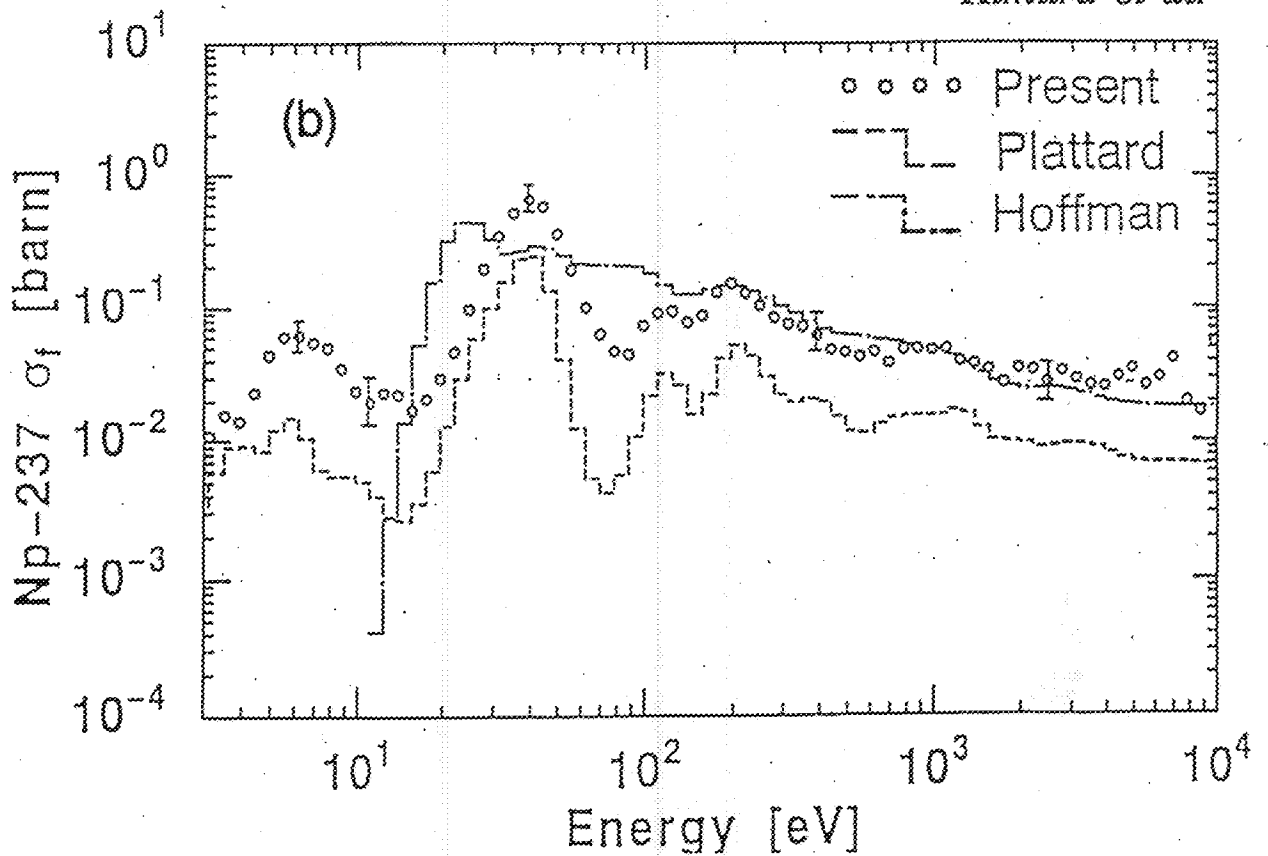
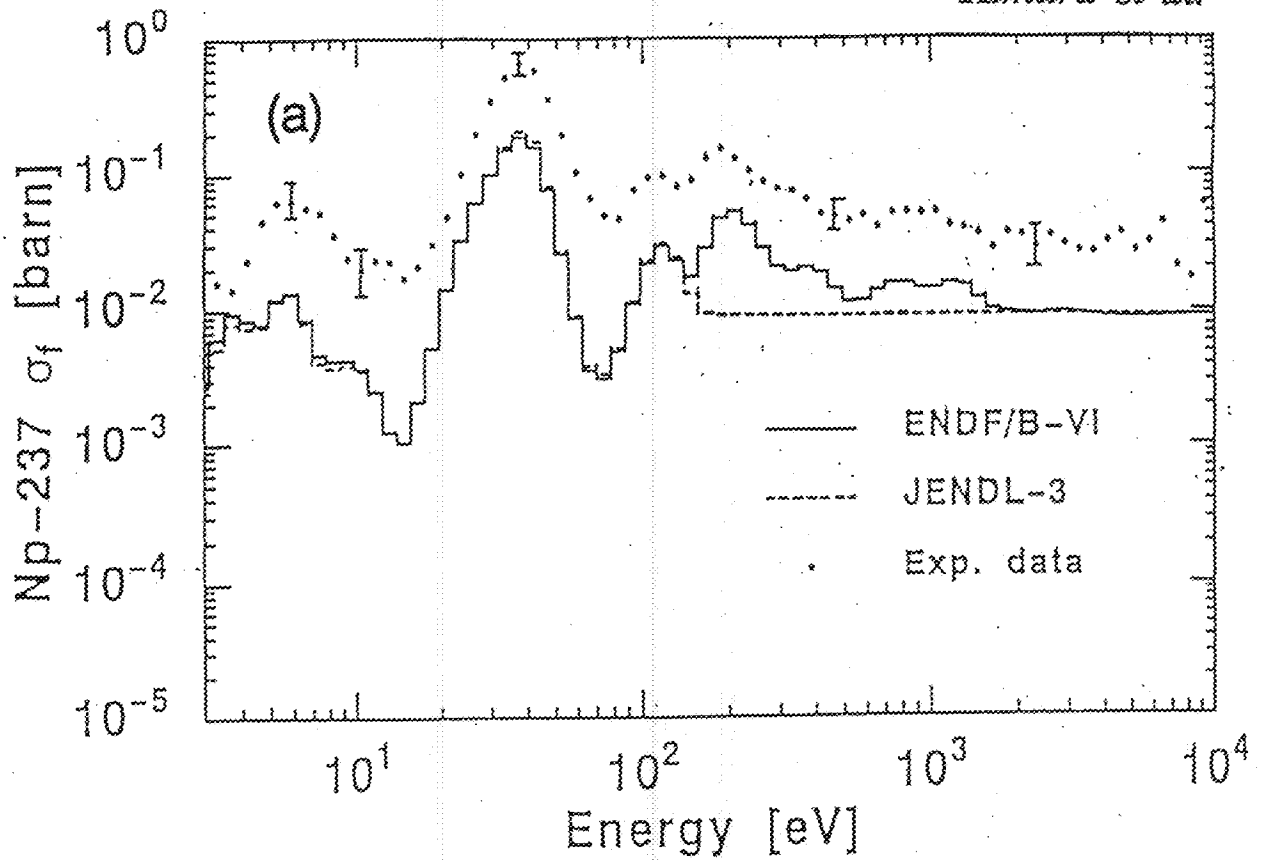


Fig.1 ^{237}Np fission cross section

Experimental data measured at Kyoto University are compared with evaluated data in Fig. 1(a) and with other experimental data in Fig. 1(b).

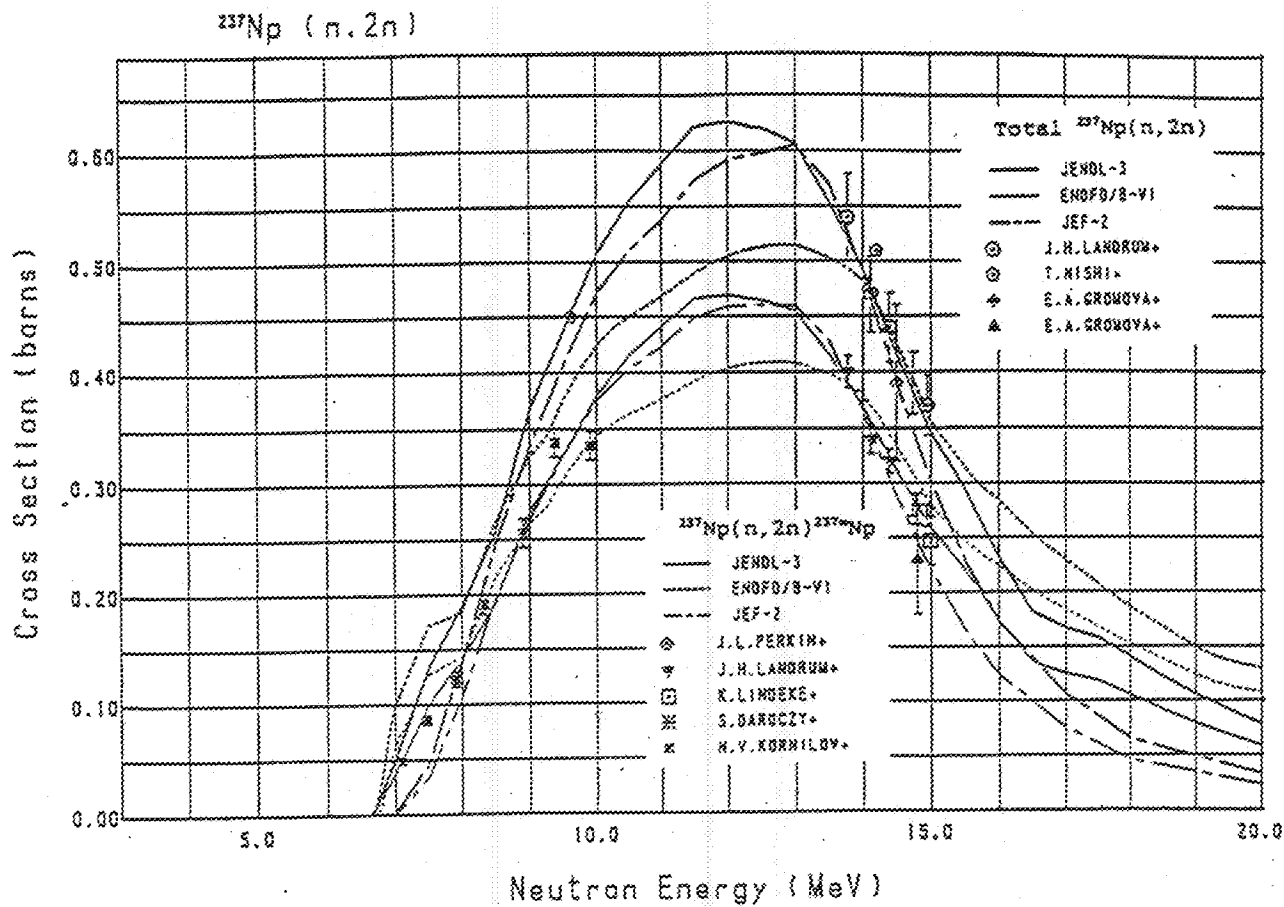


Fig. 2 $^{237}\text{Np}(n,2n)$ cross section

Average cross sections in typical BWR and FBR neutron spectra are as follows:

(unit: mb)

	total	BWR		total	FBR	
		ground	isomer		ground	isomer
JENDL-3	0.989	0.247	0.742	0.457	0.114	0.343
ENDF/B-VI	0.998	0.231	0.767	0.459	0.106	0.353
JEF-2	0.769	-	0.605	0.357	-	0.281

²³⁷Np INELASTIC SCATTERING

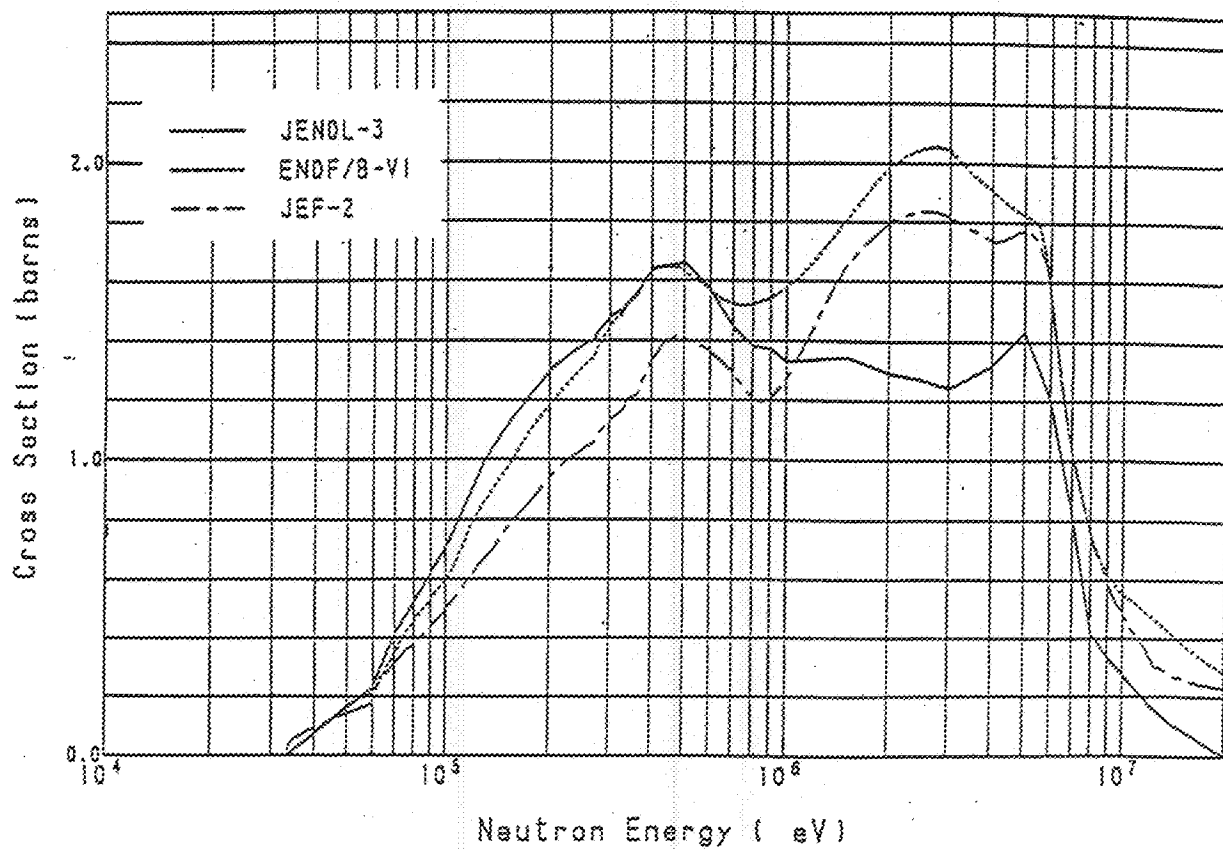


Fig. 3 ²³⁷Np inelastic scattering

²⁴¹Am INELASTIC SCATTERING

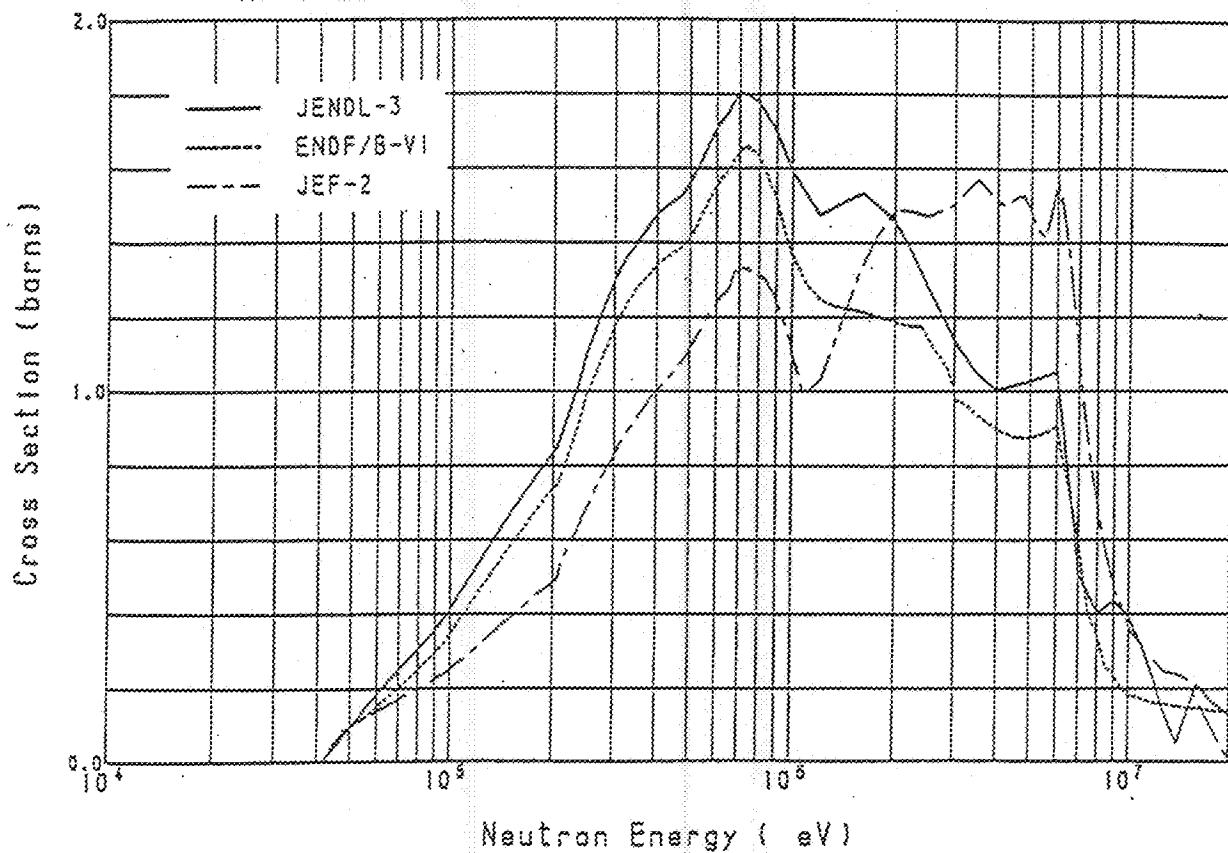


Fig. 4 ²⁴¹Am inelastic scattering

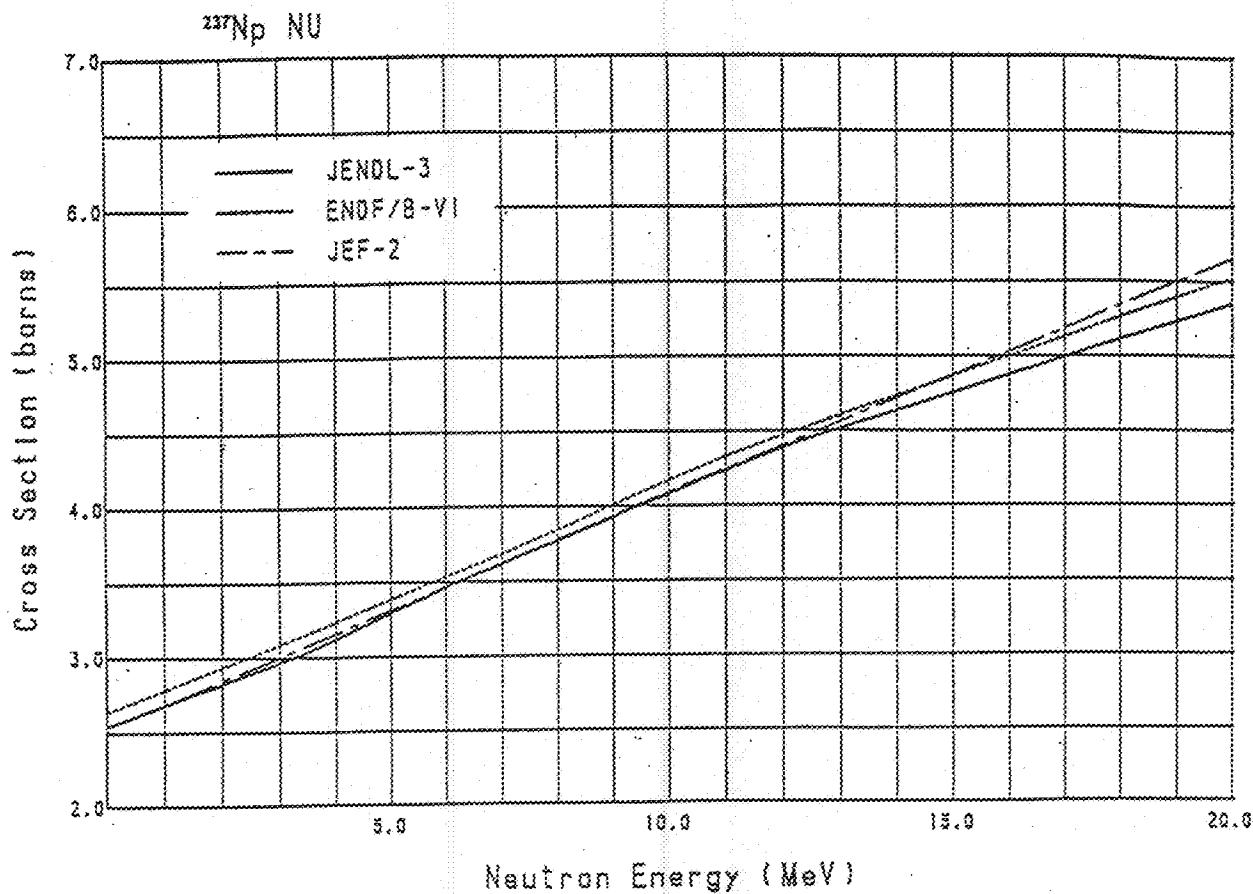


Fig. 5 ²³⁷Np total ν

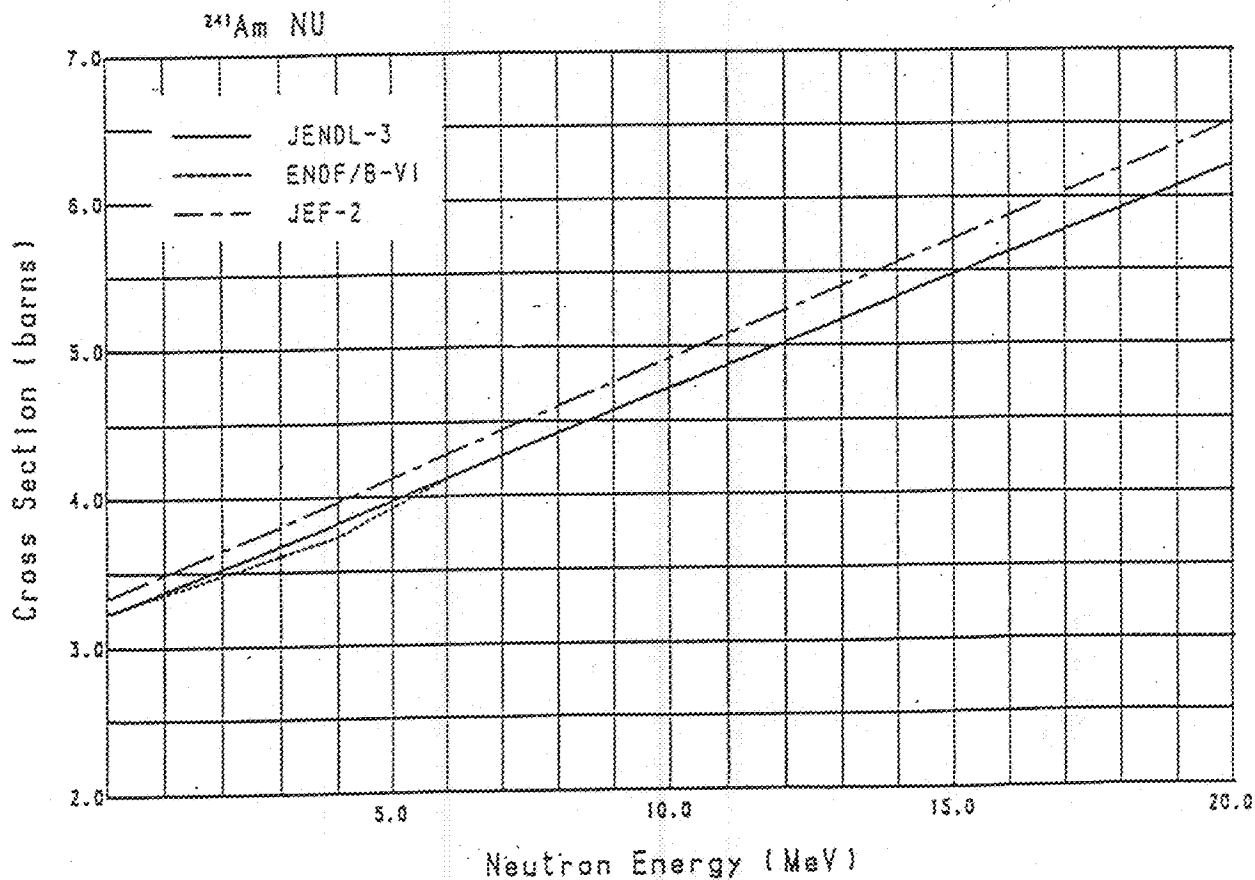


Fig. 6 ²⁴¹Am total ν