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**Abstract**

Neutron scattering cross-section of  $^{240}\text{Pu}$  have been investigated using an attractive potential. On applying the modified Pöschl-Teller model, the total cross-section of the  $n+^{240}\text{Pu}$  in the energy range of 5-20 MeV have been calculated. It was compared with the available experimental data and evaluated data of JENDL-4.0, ENDF/B-VII.0 and CENDL-3.1 as well as with the theoretical values from TALYS-1.2 Nuclear Reaction Program, EMPIRE: 2.19 Nuclear Reaction Model Code and are found to be in reasonably good agreement. This supports the validity of the present calculation.

**Keywords**

Total cross-section, Pöschl-Teller potential, Experimental data, Evaluated data of JENDL, CENDL, ENDF, TALYS and EMPIRE.

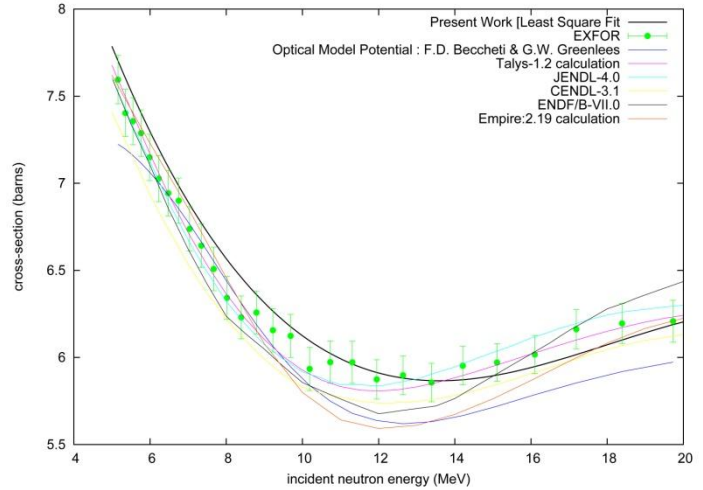


Figure1.

**Introduction**

Accelerator-Driven Sub-critical Systems (ADSS) [1-2] are of primary interest in recent times from the point of transmutation of long-lived fission products and incineration of long-lived minor actinides (MA) ( $^{237}\text{Np}$ ,  $^{240}\text{Pu}$ ,  $^{241}\text{Am}$ ,  $^{243}\text{Am}$  &  $^{244}\text{Cm}$ ) to solve the problem of radioactive wastes. On the other hand, Advanced Heavy Water Reactors (AHWR) and Fast Reactors are presently of primary interest. Among the five long-lived minor actinides,  $^{240}\text{Pu}$  is a part of constituent fuel in ADSS and fast reactor, whereas in AHWR  $^{232}\text{Th}$ ,  $^{233}\text{U}$  is the primary fuel. It is necessary to have knowledge about the different nuclear data such as reaction/fission cross-section. The total cross section for  $n+^{240}\text{Pu}$  in the energy range 5-20 MeV is given in the figure 1.

This is purely a phenomenological approach as the parameters may be adjusted freely, starting from the experimental data. The parameters used in the model are shown in Table 1.

**Conclusions**

The present calculations are in excellent agreement with the experimental data, which means that the parameters are appropriate for calculation of transmission coefficients, and cross-sections.  $^{240}\text{Pu}$  has been chosen because it is a long lived actinide used in Accelerator Driven Sub-critical Systems (ADSS).

**References**

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$E_{lab}$ (MeV)	$V_v$ (MeV)	$W_v$ (MeV)	$W_s$ (MeV)	$V_{so}$ (MeV)	$\chi^2$
5.351	48.6	0.0	9.2	6.2	0.178
6.228	48.2	0.02	9.37	6.2	1.176
6.751	48.0	0.07	9.41	6.2	1.058
9.226	46.8	0.24	10.35	6.2	0.165
10.19	46.1	0.31	10.5	6.2	0.089
12.64	44.3	0.6	9.2	6.2	0.018
14.21	43.1	1.7	8.7	6.2	0.137
17.19	42.3	3.2	8.2	6.2	0.132
18.39	41.8	3.8	7.9	6.2	0.102

Table 1.