ANALYSIS OF THE SENSITIVITY OF SPECTRUM-AVERAGE CROSS SECTIONS TO INDIVIDUAL CHARACTERISTICS OF DIFFERENTIAL EXCITATION FUNCTIONS*

by

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ABSTRACT

A simple procedure for analyzing the sensitivity of computed spectrum-average cross sections to detailed properties of excitation functions for threshold nuclear reactions commonly used in reactor dosimetry is described. The approach is based upon consideration of two energy-dependent functions F and G defined by the formulas

$$F(E) = \int_0^E \sigma(\varepsilon)\phi(\varepsilon)d\varepsilon$$

and $$G(E) = \int_0^E \sigma'(\varepsilon)\phi(\varepsilon)d\varepsilon,$$

where σ is the differential excitation function, σ' is its first derivative with respect to energy, and ϕ is the neutron spectrum used in computing the spectrum-average cross section $\langle\sigma\rangle$. This procedure is shown to be useful in identifying specific needs for improved differential data and as a tool to be employed in performing evaluations. Several examples are presented to illustrate the subject matter.

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