A New Experimental Approach for the Experimental Determination the Spectal Indices R-28 and D-25.

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It has been having a great deal of effort related to the U-238 resonance absorption of thermal reactors (see `http://www.nea.fr/lists/ueval` for details). New libraries have been generated at Los Alamos and at Oak Ridge and several benchmark calculations are under way. It has also been recognized the need of new experiments. The main purpose of this work is to present a new approach for the measurements of the spectral indices R-28 (ratio of the epitherma to thermal neutron captures in U-238) and D-25 (ratio of the epithermal to thermal fissions in U-235). The measurements are realized in the assymptotic region of the IPEN/MB-01 reactor facility. The proposed method does not require any sort mathematical corrections needed for the cadmiun perturbations and even for the transformation of the measured data into a thermal cutoff of 0.625 eV. The proposed method is based on a gamma scanning technique of the fuel rod. Such a apparatus has a opening collimator of 1.0cm. The methodology considers an experimental fuel rod where it is chosen two positions along its axial directions whrere the reaction rates are symmetrical. One posiiton is kept bare while the another one is covered with a sleeve of specified size and thickness of cadmiun. This cadmiun sleeve position is chosen such that it does not perturb the opposite bare axial position. The gamma spectrometry countings are performed alternately in the bare position and in the central region of the cadmiun covered position. From the photopeak countings of Np-239 and Ce-143 one can infer the reaction rates of U-238 and U-235. In the case of U-235 there is some corrections due to the U-238 fissions. The cadmiun ratio is taken conversely for each of the reaction rates considered in this work. The final results shows that a good agreement is achieved for the U-235 case for several libraries. However, for the U-238 case (R-28) much work still has to be devoted since the calculated results are unpredicted when compared to the experimental ones. The recent improvements of the Keff comparison reported by several works at the ueval page related to the the new U-238 release (ornl2) may not have the proper support when the spectral indices are considered. A complete analysis is still going on at IPEN and a detailed description will be given in the final paper.

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