

NEW NUCLEAR DATA LIBRARIES FOR PB AND BI ISOTOPES

A.J. Koning, M.C. Duijvestijn, S.C. van der Marck, R. Klein Meulekamp and A. Hogenbirk
NRG Petten, The Netherlands

Abstract

New ENDF-6 formatted nuclear data libraries are presented for all isotopes of Pb and Bi. Apart from the resonance range, which we have adopted from the best available existing library, the nuclear data evaluations are completely revised, and extend up to 200 MeV. This collection of isotopic evaluations is created by running our nuclear model code TALYS with input parameters that deviate only slightly, or not at all, from the default values, depending on the availability of experimental data. The isotopic evaluations are thus of comparable quality.

For each isotope, the same set of nuclear models is used and, equally important, the same set of ENDF-6 formatting procedures. We have intended to make these evaluations complete in their description of reaction channels, and use a compact method to store the data, which include cross sections, angular distributions, double-differential spectra, discrete and continuum photon production cross sections, and residual production (activation) cross sections including isomers.

It is shown that our libraries give the best agreement with existing microscopical nuclear data. Moreover, we have validated the new libraries with criticality and shielding benchmarks, where available. Most important, we will present the results of neutronics calculations on subcritical ADS systems (notably systems from the PDS-XADS project) to show the impact of our new nuclear data on critical reactor parameters, such as k_{eff} , when compared with the existing ENBDF/VI, JENDL and JEFF libraries.