Accurate Nuclear data for present and future reactors from the ANDES project

E. M. González-Romero on behalf of the ANDES Euratom project
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas
CIEMAT. Madrid (Spain)

Abstract

The ANDES FP7-EURATOM project, Accurate Nuclear Data for nuclear Energy sustainability, intends to address the nuclear data needs associated to the new reactors and new fuel cycles supported by SNETP, in its strategic research agenda and in the ESNII proposal, taking into account the priority lists for nuclear data from NEA/OECD, FP6-EURATOM projects EUROTRANS-NUDATRA and CANDIDE.

ANDES combines a reduced group of selected differential measurements, the improvement in uncertainties and covariance's within the evaluation process and the validation of present and new data libraries using integral experiments, to bring most critical nuclear data to the level of accuracies required by the new reactors and system promoted by ESNII and the SNETP. In addition, a specific work package will improve the prediction capabilities of high-energy transport codes for the design of ADS, developing better models and performing a few selected measurements.

The research of ANDES is particularly relevant for P&T research because the involvement of isotopes, materials and concepts not widely included in present reactors and often lacking of required accuracy and operational experience.

The progress and preliminary results of the project will be presented in this paper, including:

Accurate new measurements of capture and other cross sections for minor actinides like 241Am, major actinides like 238U, fission cross sections of Pu and minor actinides, and for other inelastic cross sections,

Recent developments on data evaluation tools, particularly to include uncertainty and covariance matrices, as well as updates of simulation tools to facilitate the regular use of these covariances in standard problems,

Comparisons of new calculation tools, data and codes, with criticality and experimental reactor benchmarks as well as with dedicated integral experiments, and feedback to evaluators and measurement programs,

Recent validation of high energy reaction models, new data from neutrons beyond 100 MeV and progress in the high energy reactions models for improving accuracy and extending the energy range of applicability.

Finally an outlook of the additional results expected by the end of the project will also be included.