

CIELO Fe-56

Date: 13 January 2014

Place: Phone conference

Time: 8am-9am in LANL (GMT-7), 4pm-5pm in Paris (GMT+1)

Participants:

BNL: M.Herman, S.Hoblit, D.Brown

LANL: M.Chadwick, T.Kawano, A.Kahler

ORNL: L.Leal

NRG: A.Koning, D.Rochman

IRMM: A.Plompen

IAEA: A.Trkov

NEA: E.Dupont

This phone conference is the first in a series proposed by M.Chadwick in order to share progress and plans on CIELO evaluations. A short-term milestone is to have starter files by May 2014¹. It is proposed to have weekly phone conference focused on one specific nuclide each time (Fe, Bi-3, O, H). Key actors for the nuclide under discussion are invited to join the phone conference.

A.Plompen reported on ⁵⁶Fe inelastic scattering cross section measured up to 5 MeV at IRMM. These data are not yet published, but they are already used by L.Leal and could be made available within CIELO. There is also ongoing measurement of the ⁵⁶Fe capture cross section by P.Schillebeeckx.

A.Koning noted that JEFF is the only file to correctly reproduce resonant fluctuations in the partial inelastic scattering cross sections.

L.Leal reminded us of the work he performed in order to extend the Resolved Resonance Region (RRR) up to 2 MeV using a selection of experimental data including angular distributions, and using recent data from RPI and IRMM. He informed us of further extension of the RRR in the range from 2 MeV to 4 MeV where only the total inelastic width could be used (too many partial inelastic channels). This new resonance parameter (RP) set should be ready within one month (by the end of February) and made available to IRSN, CEA Cadarache, and CIELO. Constructive feedback is welcome.

It was noted that this new resonance parameters exercise new options in both ENDF format and processing codes but everybody agreed that NJOY2012 should be able to process them up to 2 MeV. A.Kahler will check with R.MacFarlane if this is possible to combine the 2 sets of resonance parameters (0-2MeV and 2-4MeV).

M.Herman suggested that it might not be useful to extend the RRR beyond 2 MeV. A.Trkov suggested first to check groupwise cross sections and proposed a two-steps approach that would also be helpful to check for compensating effects between the 2 RP sets in the integral validation. In a first validation step, the RRR upper limit could be set to 2 MeV. A second validation step with the RRR extended to 4 MeV could be done later.

E.Dupont noted that there is no Unresolved Resonance Region (URR) in the recent ⁵⁶Fe files (JEFF-3.1.2, JENDL-4.0, ENDF/B-VII.1) and wondered whether this should be something to worry about.

¹ See NEMEA-7/CIELO workshop summaries at www.oecd-nea.org/science/wpec/nemea7/presentations.html

L.Leal answered that one of the objectives of his work beyond 2 MeV is precisely to model this energy region.

M.Herman and A.Trkov will create a starter file that includes L.Leal's new work below 2 MeV. At the end of the day there will be a full new evaluation, but as part of the incremental validation process the new RP could be first fused with existing JEFF or ENDF files.

L.Leal and A.Trkov recommended not to neglect natural iron and other iron isotopes, especially ^{58}Fe (for dosimetry) and ^{54}Fe (5.8% of Fe-nat).

M.Herman reported on plans to produce a new evaluation in the high energy region using a new soft-rotor OMP. He proposed to provide ENDF formatted file down to 2 MeV arguing that it will be easy to cut at higher energy if the RRR extends beyond this limit. A.Trkov noted that calculations should actually be performed at much lower energy down to the keV region to provide gamma spectra.

A.Koning informed us that NRG could also produce a new evaluation merged with L.Leal's work for comparison and perform integral testing. M.Herman commented that integral benchmarking will also be done in the US but not before May.

It was stressed that existing files are fairly mature, and even if some of them are a bit dated they are "not bad". The new evaluation will rely on better underlying physics and will use some new resonance data, but it is essential to track integral performances in order to further improve them.

A.Trkov proposed to circulate a list of benchmarks relevant for the validation of iron data. It was noted that RPI quasi-elastic scattering experiments on iron would be very valuable but they will probably not be available before May. After the meeting, Y.Danon confirmed that these data cannot be released before publication, but proposed to test the new evaluations as part of the data analysis process. The new evaluation should be sent in ACE format in order for RPI to easily repeat the simulation and send back plots with experimental and calculated results.

E.Dupont mentioned that SG39 agreed to study the results of large adjustment/assimilation studies already performed at JAEA, INL, CEA in order to provide integral feedback on CIELO nuclides in May (or November).

M.Herman proposed to develop the new ^{56}Fe evaluation using NNDC GForge environment² and to make all materials publicly available. Everybody agreed, but this still has to be checked with L.Leal who will be the first to provide new data.

The question whether all CIELO evaluations should be developed using GForge was raised. M.Herman said that he would agree, but this is up to other CIELO teams to decide how they want to organize the work for other CIELO nuclides. E.Dupont mentioned that there are no such tools at the NEA. After the meeting, A.Trkov informed us that the prospects of a GForge server at the IAEA are promising, but there remain a few open issues that need to be resolved.

Adjourn

² See https://ndclx4.bnl.gov/gf/project/cielo_iron/