

## CIELO O-16

**Date: 6 February 2014**

Place: Phone conference

Time: 16:00 (Paris, GMT+1), 8:00 (Los Alamos, GMT-7), midnight (Tokyo, GMT+9)

Participants:

IRMM: A.Plompen

JAEA: S.Kunieda

KAPL: C.Lubitz

LANL: G.Hale

IAEA: S.Simakov

NEA: E.Dupont

The objective of this phone conference is to share progress and plans on the  $^{16}\text{O}$  evaluation for the CIELO pilot project. A short-term milestone is to have a starter file by May 2014. For  $^{16}\text{O}$ , leading actors are in the US, Europe and Japan with very different time zones. Hence, it was planned to split the discussions. This first phone conference was scheduled during working hours in US and Europe and mainly focused on experimental data. A second phone conference will be scheduled during working hours in US and Japan in order to further discuss data modelling.

A.Plompen summarized the experimental information available for the  $^{17}\text{O}$  system (see NEMEA/CIELO presentations<sup>1</sup>). At low energy (up to a few keV), the status of the neutron scattering and total cross section data was reviewed by S.Kopecky and the NEMEA/CIELO paper is being prepared. As noted by C.Lubitz during the workshop, the  $\text{SiO}_2$  measurements should be corrected using the latest Si data. At higher energy, additional data are available for the (n,a) and (a,n) channels. G.Giorginis (now retired) recently proposed an update to the “drift velocity” correction that must be applied to the (n,a) cross section measured at IRMM. Above  $E_n \sim 6$  MeV, the latest corrected data are now consistent with the one measured by V.Khryachkov at IPPE. After the meeting, G.Giorginis showed how the agreement among IRMM, IPPE and Bair & Haas data at  $\sim 6.4$  MeV may influence the re-normalisation below 6 MeV. However, there is still a disagreement with the (a,n) data measured by Harissopulos that has to be clarified.

G.Hale said that this is very encouraging because the new IRMM correction is going in the right direction to derive a set of resonance parameters consistent with experimental information from the (n,a) and (a,n) channels, and from the total cross section. In addition, the other corrections discussed earlier (e.g. taking into account the amount of  $\text{H}_2\text{O}$  in the Ohkubo and Johnson samples) are also going in the right direction and do not affect the unitary consistency as confirmed by S.kunieda. The R-Matrix analysis should now be repeated after having done all required corrections.

A.Plompen noted the review performed by S.Simakov and illustrated in the plots given below. It shows that the (a,n) data measured by Bair & Haas should be re-normalised, but also that there is another issue in the energy scale that should be clarified (see the last plot with alpha energies between 2.5 MeV and 2.9 MeV). S.Simakov commented that one can see a shift in the peak positions of different data sets, as well as differences in peak amplitudes. He added that in the case of Bair & Haas and Harissopulos data the quoted energy was the effective energy of the alpha particle at the center of the target. He also asked if evaluators consider small shifts of resonances during fitting procedure why then the ENSDF resonances, which are adopted from many reactions, cannot be used as reference values. A.Plompen noted that corrections for target thickness effects are difficult and that a full analysis should be done.

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<sup>1</sup> [www.oecd-nea.org/science/wpec/nemea7/presentations.html](http://www.oecd-nea.org/science/wpec/nemea7/presentations.html)

C.Lubitz suggested using the total cross section measured by Cierjacks as a reference for the energy scale. G.Hale commented that level energies are obviously the same for all reaction channels but this is not necessarily true for the peak positions, which may be shifted. It was agreed to use the R-Matrix theory to estimate the energy shift that one may reasonably expect between the (n,a) and the total cross sections.

E.Dupont inquired about the situation at higher energy (beyond  $E_n \sim 6$  MeV). G.Hale commented that the new IRMM data are now more consistent with ENDF/B-VI.8 as compared to ENDF/B-VII, which was adjusted on preliminary results. A.Plompen noted that the R-Matrix analysis will be difficult as soon as additional channel becomes significant. G.Hale said that he has done the analysis up to 7 MeV but agreed that the “resonance region” should stop at the opening of the (n,a<sub>1</sub>) channel, i.e.  $E_n \sim 5.6$  MeV. Of course, the “resonance region” will be complemented with MF3 data at higher energy (up to 150 MeV in ENDF/B-VII.1).

C.Lubitz noted that there is no resonance parameter in the ENDF/B-VII.1 evaluation and recommended to provide those parameters in the CIELO evaluation. He would also be interested to have access to the resonance parameters associated to the ENDF/B-VII.1 evaluation in order to test the integral performances of slight (consistent) adjustments in the low energy cross sections. Actually, the availability of resonance parameters was the main reason for using the SAYER 2000 evaluation for these integral tests and similar tests using ENDF/B-VII.1 data would be useful.

G.Hale answered that the EDA code uses relativistic kinematics to adjust the resonance parameters and this formalism is not available in the ENDF format. C.Lubitz thinks that feeding G.Hale’s File 3 total and elastic and maybe (n,a) to SAMMY as experimental data with small uncertainties and cut off at 6.2 MeV would produce a non-relativistic fit good enough for what he needs. SAMMY would only need approximate non-relativistic resonance energies and widths as starting values.

A.Plompen mentioned that L.Leal is updating the SAYER 2000 evaluation using recent experimental data (see NEMEA/CIELO presentation). The simultaneous fit gives good result but no information was provided on the adjusted normalisations. G.Hale had concerns about possible unitary issues.

*Adjourn*



