

# Progress Report of Nuclear Data Group

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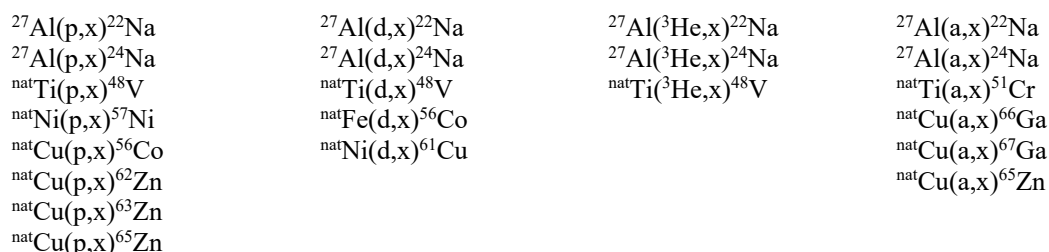
## I. Data evaluation work

### 1., *Charged-particle cross section database for medical radioisotope production Diagnostic radioisotopes and monitor reactions*

A Co-ordinated Research Project (CRP) on “Charged Particle cross-section database for medical radioisotope production: diagnostic radioisotopes and monitor reactions” was completed successfully in 2001. The result was summarized in the final report of the CRP and published in IAEA-TECDOC-1211 and on web address <http://www-nds.iaea.or.at/medical/>. The database includes recommended cross-section data and the corresponding yields calculated from the recommended cross sections.

This year update and upgrade of the 22 charged particle induced reactions can be used for monitoring were completed (Chapter 4)

The list of reactions:



Experimental microscopic cross section data published earlier and not yet included in the previous evaluation work or new data measured recently were collected and added to the primary database in order to improve the quality of the recommended data. The newly compiled experimental data influenced the decision made earlier and resulted in new selected cross-section data sets. A spline fitting method was applied to the selected data sets and updated recommended data were produced in those cases. Thick target yield was calculated for each of the investigated reactions, which was not given in the first version of the database.

A validation test of the upgraded recommended cross section database was also performed by collecting experimental integral thick target yields reported in literature and/or measuring new data for critical comparison with yields deduced from the new recommended cross sections. The upgraded data, figures and tables were sent to NDS to update the web version (<http://www-nds.iaea.org/medical/>) of the database regarding the monitor reactions part.

### 2. *Nuclear Data for Production of Therapeutic Radionuclides*

The Atomki group also participate in a CRP which was started in 2003 with the aim of improving the accuracy and completeness of the data needed for the optimum production of therapeutic radioisotopes, to undertake new measurements, to compile and evaluate all experimental data available on this area, to determine optimum conditions for the production of the selected radioisotopes and to produce accurate cross sections and comprehensive decay schemes for the investigated radionuclides.

## II. EXFOR compilation

We continued the compilation work of charged particle induced nuclear reactions in EXFOR format. During the last period 18 new entries were produced with 97 subentries containing data. Data were compiled measured in Debrecen Hungary, in Brussels Belgium, in Juelich Germany and partly in Sendai Japan.

## III. Experimental work

We continued to measure experimental cross sections of light charged particles (proton, deuteron,  $^3\text{He}$  and alpha) induced reactions on various targets Ti, Ni, Pd, Nb Er, Tm. Data are assessed or under process. Results were reported in scientific journals or relevant conferences. See list of publications.

## IV. List of publications in 2007

Takács S., Tárkányi F., Király B., Hermanne A., Sonck M., *Evaluated activation cross sections of longer-lived radionuclides produced by deuteron induced reactions on natural nickel.*

NIMB 260 (2007)495

Takács S., Király B., Tárkányi F., Hermanne A.: *Evaluated activation cross sections of longer-lived radionuclides produced by deuteron induced reactions on natural titanium.*

NIMB 262 (2007)7

Tárkányi F., Hermanne A., Takács S., Ditrói F., Spahn I., Kovalev S. F., Ignatyuk A., Qaim S. M.: *Activation cross sections of the  $^{169}\text{Tm}(d,2n)$  reaction for production of the therapeutic radionuclide  $^{169}\text{Yb}$ .*

JARI 65 (2007)663

Tárkányi F., Hermanne A., Takács S., Ditrói F., Király B., Kovalev S. F., Ignatyuk A.: *Investigation of new routes for production of the therapeutic radionuclides  $^{169}\text{Yb}$  and  $^{165}\text{Er}$ .*

Journal of Labeled Compounds and Radiopharmaceuticals. Supplement 50 (2007)99

Tárkányi F. 1, Hermanne A., Takács S., Ditrói F., Király B., Baba M., Ohtsuki T., Kovalev S. F., Ignatyuk A.: *Study of activation cross sections of deuteron-induced reactions on erbium for applications.*

Journal of Labelled Compounds and Radiopharmaceuticals 50 (2007)487

- Tárkányi F., Hermanne A., Ditrói F., Takács S., Király B., Baba M., Ohtsuki T., Kovalev S. F., Ignatyuk A.: *Production of longer lived radionuclides in deuteron induced reactions on niobium.*  
NIMB 255 (2007)297
- Tárkányi F., Király B., Ditrói F., Takács S., Csikai Gy., Hermanne A., Uddin M. S., Hagiwara M., Baba M., Ido T., Shubin Yu. N., Kovalev S. F.: *Activation cross sections on cadmium: Deuteron induced nuclear reactions up to 40 MeV.*  
NIMB259 (2007)817
- Tárkányi F., Hermanne A., Király B., Takács S., Ditrói F., Baba M., Ohtsuki T., Kovalev S. F., Ignatyuk A.: *Study of activation cross-section of deuteron induced reactions on erbium: Production of radioisotopes for practical applications.*  
NIMB259 (2007)829
- Ditrói F., Tárkányi F., Takács S., Mahunka I., Csikai Gy., Hermanne A., Uddin M. S., Hagiwara M., Baba M., Ido T., Shubin Yu. N., Dityuk A. I.: *Measurement of activation cross sections of the proton induced nuclear reactions on palladium.*  
Journal of Radioanalytical and Nuclear Chemistry 272 (2007)231