Contribution ID: **93** Type: **Poster**

Preparation of 57Co sources for Mössbauer Spectroscopy

Wednesday, 19 September 2012 18:00 (1h 50m)

The method of preparation of 57Co source applied in Mössbauer Spectroscopy was developed. This method comprised electrodeposition of carrier-free 57Co on rhodium foil followed by thermal diffusion of 57Co into rhodium matrix. A series of experiments were performed in order to determine the optimal conditions for electrodeposition of cobalt on rhodium foils 6um thick. Electrochemical cell consisting of platinum anode and rhodium disc as the cathode was chosen. The electrolyte was an aqueous solution of ammonia citrate 25g/l, hydrazine hydrate 25/l and carrier-free 57Co in the form of 57Co(II) in 0,1M HCl. The diffusion of 57Co into rhodium lattice was carried out by annealing the foil at temperature of 1100˚C at high vacuum, in quartz tube. The 57Co active cores were encapsulated in cylindral Ti capsules with Be windows. The Mössbauer spectra were measured to verify the quality and efficiency of the testing sources. The experiments performed allow making an optimum choice of the electrodeposition parameters of carrier-free 57Co on rhodium foil. The highest efficiency approaching 100% and the best rate of deposition were obtained using current density 50mA/cm2 and electrolyte volume –5ml. The best results of diffusion of electrodeposition cobalt-57 onto rhodium matrix was obtained in an annealing process at 1100˚C in vacuum over 10-6 hPa. The main spectra parameters of the prepared sources are fairly acceptable with respect to the typical obtainable values for α-Fe absorbers in Mössbauer spectroscopy. The results obtained confirm that the deposited layer diffused almost completely into rhodium matrix without substantial loss of the activity deposited.

Primary authors: CIESZYKOWSKA, Izabela (National Centre for Nuclear Research, Poland); Dr ŻÓŁTOWSKA, Małgorzata (National Centre for Nuclear Research, Poland)

Co-authors: PIASECKI, Andrzej (National Centre for Nuclear Research Radioisotope Centre POLATOM); MIELCARSKI, Mieczysław (National Centre for Nuclear Research Radioisotope Center POLATOM); ZACHARIASZ, Piotr (National Centre for Nuclear Research Nuclear Methods In Solid State Physics Division); JANIAK, Tomasz (National Centre for Nuclear Research Radioisotope Centre POLATOM)

Presenter: Dr ŻÓŁTOWSKA, Małgorzata (National Centre for Nuclear Research, Poland)

Session Classification: Poster Session

Track Classification: Nuclear Chemistry, Radionuclide Production, High-Power Targetry