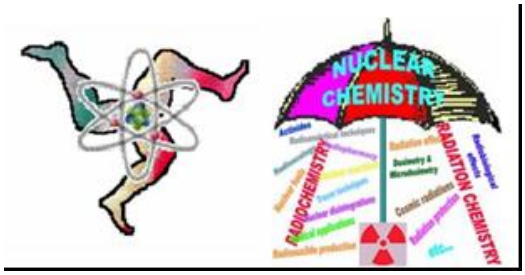

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An automated production of Cu-64 on 18/9 MeV cyclotron

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The reaction route 64Ni(p,n)64Cu is very popular for the preparation of 64Cu because its entrance channel is accessible at low energies and yield of reaction is quite high. However, a high price of the enriched 64Ni is a disadvantage of this reaction path; hence, preparation of a chemically pure nickel targets for the production of 64Cu using COSTIS (Compact Solid Target Irradiation System) is of a great research interest. Composition of electrolytic bath and electrochemical process conditions on the quality of nickel films deposited on 2 mm thick gold disc targets was investigated. Chemical purity of the electrodeposited nickel was measured by the Auger electron spectroscopy and the surface quality of targets was studied microscopically (SEM). A SRIM program was used for a thickness target calculation.
COSTIS target station was installed at the end of the external beam line of the IBA Cyclone 18/9 cyclotron, and the irradiation surface of target was optimized. The target station has been equipped by a Nb window foil in the front of the target to degrade the beam energy to an optimal value. 64Cu production rate for 100 mg 64Ni of 99.09 % purity (ISOFLEX) on gold target was 104 MBq/μAh. Chemical separation of 64Cu from 64Ni was achieved by anion exchange chromatography method using 6 M HCl as elution solution. An automated separation module for isolation of 64Cu equipped with PLC SIMATIC S7-1200 controller has been developed. The quality of 64Cu was checked by gamma spectrometry and chemical purity (64Ni) was determined by ICP-MS.

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