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Preparation and characterization of target for ⁶⁴Cu production on the IBA 18/9 Cyclotron.

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Copper has many radionuclides (60Cu, 61Cu, 62Cu, 64Cu, and 67Cu) that can be used in nuclear medicine and molecular imaging. Isotope 64Cu (Iβ+= 17.6 %, Eβ+max=653 keV, Iβ-= 38.5 %, Eβ-max=579.4 keV) is positron emitters and half life 12.7 hrs and is suitable for the preparation of radiopharmaceuticals for PET imaging. The 64Ni(p,n)64Cu reaction route is popular for its preparation because its entrance channel is accessible at low energies and yield of reaction is quite high. Disadvantage of the reaction used is a high price of the enriched 64Ni. Thick gold or platinum target were used for target preparation by electrodeposition. Irradiation surface of target was optimized for COSTIS station. COSTIS target station was installed at the end of the external beam line of the IBA Cyclone 18/9 cyclotron. The target station has been equipped with aluminum or Nb window foil in front of the target to degrade energy to optimal energy for nuclear energy less then12 MeV. Since the external beam line of the cyclotron has no beam diagnostic devices, several aluminum plates were irradiated in the COSTIS target station with a 5 μA proton beam for 15 min. with different settings for the beam focusing quadrupole magnets. After one day decay time the plates were scanned by a TLC scanner along the horizontal and vertical central axes of the plates in order to visualize the beam shape. The settings providing most homogeneous beam spot on the target were selected and used further for the real target irradiations. Presentation will concerns of preparation, optimization of target for irradiation in COSTIS target station, separation procedure and characterization of 64Cu radiochemical prepared.

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