Production of $^{123}$I and $^{64}$Cu on a 18/9 MeV cyclotron as a starting material for radiopharmaceuticals preparation.

P. Rajec$^{1,2}$, V. Cafca, M. Lepori$^{1,2}$, M. Štefečka$^1$, L. Lepori$^1$, M. Reich$^1$, J. Comriková$^1$, M. Ometákova$^1$, J. Ometákova$^1$

$^1$Faculty of Natural Sciences, Department of Nuclear Chemistry, Comenius University, Mlynská dolina, 842 15 Bratislava, Slovakia
$^2$IBA-Bratislava, Slovakia

Iodine-124 ($T_{1/2} = 4.38$ d) and $^{64}$Cu were produced by the positron emission tomography (PET) method using a single $^{99m}$Tc(TcO$_4^-$)-target. The geometrically defined beam spot from the IBA Cyclone 18/9 cyclotron was chosen for the actual target irradiations. The radionuclidic purity of the $^{123}$I and $^{124}$I produced on the COSTIS target station connected with the external beam of the IBA cyclotron was evaluated on the cyclotron and irradiated with a 25 μm thick aluminium or 25 μm thick Nb disks. The TEP module was placed in the beam line, $E_{\text{BEAM}} = 183$ MeV is a high purity of enriched $^{123}$I. The major reaction route is $^{123}$I($\gamma$,n)$^{124}$I. The enrichment is $96.4\%$. The gamma spectrum of the product was measured by a γ-ray spectrometer.

**COSTIS target station connected with the external beam of the IBA cyclotron**

**Irradiated $^{123}$TeO$_2$ target**

**TERIMO - scheme from the computer screen**

**The electrochemical cell**

**Ni electrodeposited onto gold disk**

**Ni Surface enlargement – 50x**

**EDX of electrodeposited Ni**

**Paper chromatography $^{123}$I – Rf 0.783**

**Beam profile measured on Al disk; Nb window 0.25 mm**

The authors are indebted to IBA Vienna and the Slovak Research and Development Agency for financial support during realization of the project ESRF-010 Production of the Positron Emitting Radionuclides and the work connected with $^{64}$Cu production was supported by the Slovak Research and Development Agency under the contract No. VEGA 0075-50.