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## Radiochemical separation of no-carrier-added $^{97}\text{Ru}$ and $^{95}\text{Tc}$ produced by $^{12}\text{C}$ -induced reaction on natural yttrium target

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Due to favourable nuclear and chemical properties, the radionuclides,  $^{97}\text{Ru}$ ; 2.83 d,  $\gamma$ -rays: 215.70 keV (85.62 %) and 324.49 keV (10.79 %) and  $^{95}\text{Tc}$ ; 20.0 h,  $\gamma$ -rays: 765.789 keV (93.8 %), have been found promising for the investigation of delayed physico-chemical and biological processes. Various  $^{97}\text{Ru}/^{95}\text{Tc}$ -labelled complexes have also been proposed for this purpose. Production of high purity radionuclides is therefore important. So far they have been produced either by light charged particle induced reactions or by neutron activation method. This paper illustrates simultaneous production of  $^{97}\text{Ru}$  and  $^{95}\text{Tc}$  in a heavy ion induced reaction and their subsequent separation from the bulk by ion exchange technique. A natural yttrium foil was irradiated by 75 MeV  $^{12}\text{C}^{6+}$  ions for 3.5 h. Thick target yields of 514 and 338 kBq/ $\mu\text{A}\cdot\text{h}$  were achieved for  $^{97}\text{Ru}$  and  $^{95}\text{Tc}$  respectively at the end of bombardment. The target was dissolved in 0.1 M HCl, spiked with  $^{88}\text{Y}$  (106.6 d), evaporated to dryness, and residue was taken into 0.01 M HCl. The nca  $^{97}\text{Ru}$  and  $^{95}\text{Tc}$  was then radiochemically separated from bulk yttrium by liquid-liquid extraction (LLX) using liquid anion exchanger trioctylamine (TOA) and liquid cation exchanger di-(2-ethylhexyl)phosphoric acid (HDEHP) dissolved in cyclohexane from HCl solution. More than 98% nca  $^{95}\text{Tc}$  was extracted into TOA phase possibly forming anionic species leaving nca  $^{97}\text{Ru}$  and yttrium in aqueous phase. Quantitative separation of  $^{97}\text{Ru}$  was achieved while bulk yttrium was extracted quantitatively into HDEHP (1-10%) from 0.1 M HCl. The technique offers efficient chemical separation of the products ( $^{97}\text{Ru}$  and  $^{95}\text{Tc}$ ) resulting very high separation factors ( $\sim 10^6$ ).

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