



Contribution ID: 35

Type: Oral

Post-decay processes in radiopharmaceutical precursors studied via nuclear spectroscopy

Modern radiopharmaceuticals are actively used for diagnostics and therapy in nuclear medicine. The concept of a modern radiopharmaceutical allows incorporating radionuclides with similar properties to the same precursors. Radiopharmaceutical precursor and its stability play a major role in applicability of such a drug. Post-decay processes, namely Auger and conversion electron emissions, may cause a change in local environment which can lead to release of the daughter from the radiopharmaceutical and, therefore, difficulties in its application.

The present work highlights several medically relevant isotopes – ^{44}Sc and ^{111}In coupled with the chelators. ^{44}Sc ($t_{1/2} = 4.04$ h) is a radiometal with favourable decay properties for positron emission tomography (PET) and ^{111}In ($t_{1/2} = 2.8$ d) is already in the clinical use for diagnostics via single photon emission computed tomography (SPECT). Moreover, ^{111}In is a well-established probe nucleus in perturbed angular correlation of γ - γ rays (PAC), which allows for the study of hyperfine interactions and, hence, is a unique technique when analysing post-decay processes in radiopharmaceutical precursors. Also, the study demonstrates feasibility of $^{44}\text{mSc}/^{44}\text{gSc}$ radionuclide generator induced by post-decay processes. The radionuclide generator yield was measured by γ -spectroscopy and equals to $9.8 \pm 1.0\%$. This result indicates the influence of post-decay processes on the initial chelate complexes for the elements with medium Z and significantly changes the overall trend.

Notes

Primary authors: KURAKINA, Elena (JINR); Dr RADCHENKO, Valery (JINR); Dr KARAIVANOV, Dimitar (JINR); Dr VELICHKOV, Atanas (JINR); Dr MAGOMEDBEKOV, Eldar (MUCTR); Dr DMITRY, Filosofov (JINR)

Presenter: KURAKINA, Elena (JINR)