

# **<sup>90</sup>Sr-<sup>90</sup>Y generator system based on membrane-assisted liquid phase extraction**

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## **Abstract**

Long-lived radionuclide <sup>90</sup>Sr is an ideal source of carrier-free <sup>90</sup>Y ( $T_{1/2}=64.1$  h,  $E_{\beta_{\max}}=2.3$  MeV), which has suitable radionuclidic characteristics for the application in endoradiotherapy of malignant tumors. Separation of Y(III) from Sr(II) with 15% (v/v) di(2-ethylhexyl)phosphoric acid (DEHPA) in dodecane was performed using the hollow fiber supported liquid membrane (SLM) contactor operated in a recirculation mode. The influence of various experimental parameters (contact time, donor pH, DEHPA concentration, donor and acceptor flow rates) on the mass transfer rate of Y(III) and the separation effects in the applied system was investigated. The steady-state was established after about 5-6 h of operation. A yield of Y(III) in the acceptor phase increased as the flow rate of both aqueous phases increased and reached 72% at the acceptor flow rate of  $1.9 \text{ cm}^3 \text{ min}^{-1}$  and the donor flow rate of  $4.7 \text{ cm}^3 \text{ min}^{-1}$ . However, a breakthrough of Sr(II) through the SLM also increased with increasing the acceptor flow rate, so that flow conditions must be optimized to find a balance between the requirement for a high yield of Y(III) in the acceptor phase and a low breakthrough of Sr(II) through SLM. Hollow fiber SLM contactor operated in a recirculation mode under optimized flow conditions could be used for the development of <sup>90</sup>Sr-<sup>90</sup>Y generator system and milking of <sup>90</sup>Y in the form suitable for direct complexation with various chelating agents and preparation of <sup>90</sup>Y-radiopharmaceuticals.

## **Biography**

Ksenija Kumrić has completed her PhD at the Faculty of Physical Chemistry, University of Belgrade, Serbia. She is employed at the Laboratory of Physics, Vinča Institute of Nuclear Sciences, Belgrade, Serbia and working on the project: "Physics and chemistry with ion beams" financed by the Ministry of Education, Science and Technological Development of Republic Serbia. Her research work is focused in the field of Separation Chemistry, especially membrane based separation processes and adsorption; and its application in Radiochemistry, Analytical and Environmental Chemistry.

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