

عنوان مقاله:

An electro amalgamation procedure for separate no carrier added Lu177 from Yb target for biomedical applications

محل انتشار:

دوازدهمین سمینار سالانه الکتروشیمی ایران (سال: 1395)

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خلاصه مقاله:

Owing to its favorable radionuclides characteristics, such as $t_{1/2} = 6.73$ day and $E_{\beta}(\text{max}) = 497$ keV and ease of its large-scale production using medium flux research reactors, ^{177}Lu is an attractive radionuclide for various therapeutic applications. A two-step separation process for the production of no-carrier-added (NCA) ^{177}Lu from neutron irradiated Yb target through an electrochemical pathway employing mercury-pool cathode has been developed. Methods A two-cycle electrolysis procedure was considered for separation of ^{177}Lu from $^{177}\text{Lu}/\text{Yb}$ mixture in lithium citrate medium. The effects of different experimental parameters on the separation process was investigated and optimized for the quantitative deposition of Yb in presence of ^{177}Lu . The first electrolysis was performed for 45 min in the $^{177}\text{Lu}/\text{Yb}$ feed solution at pH 7 applying a potential of 10 V using platinum electrode as anode and mercury as the cathode. The second electrolysis was performed under the same conditions using fresh electrodes. ^{177}Lu has been purified from citrate lithium electrolyte by exchange chromatography column. The suitability of ^{177}Lu for biomedical applications was ascertained by labeling tetra phenyl porphyrin (TPP) with ^{177}Lu . Results In this study ^{177}Lu with $> 99.9\%$ radionuclide purity and an overall separation yield of 85% was obtained within 2–3 h. The Li content in the final product was determined to be < 1 ppm. Radiolabeling yield of 98% was obtained with TPP under the optimized reaction conditions. Conclusions An efficient strategy for the separation of NCA ^{177}Lu , suitable for biomedical applications, has been developed.

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