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Separation of ¹³¹Cs from barium radionuclides

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The implanted seeds of the Cs-131 are successfully uses in brachytherapy to treat prostate cancer and other malignant tumors. The single x-rays of Cs-131 with 30 keV damages and kills genetic materials of cancer cells, making it impossible for these cells to continue to grow while saving or minimizing damage to the healthy tissue. Besides the radioisotope Cs-131 has a short half-life (T1/2=9.7 day), making it is able to deliver a 90% of its dose energy in just 33 days compared to 204 days for I-125 (T1/2=60 day) and 58 days for Pd-103 (T1/2=17 day).
In this work, the radiochemical methods of separation of the Cs-131 from Barium radioactive isotopes are presented. The targets of barium components (BaCl2, BaCO3, BaO) were irradiated for 3-7 days, by thermal neutrons at fluxes of 5-10x1013 cm-2 s-1 of nuclear reactor. As a result of an irradiation have formed about 10 an undesirable radionuclidies, that represents a certain difficulties and radioactive safety at separation of the Cs-131 from radioactive solutions. Carrier-free Cs-131 is separated from the irradiated barium target, by precipitation of Ba2+ cations with addition of SO42- anions in excess and filtration of the formed precipitate. Chemical purity of Cs-131 was determined by gamma spectrometer of the HPGe detector.

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