Abstract Submitted
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Extraction of bismuth from nitric acid media using 1-octanol and hydrophobic liquid binary mixtures AMY L. VONDER HAAR, Cyclotron Institute, Texas AM University; Department of Chemistry and Biochemistry, Montclair State University, EVGENY E. TERESHATOV, CHARLES M. FOLDEN III, Cyclotron Institute, Texas AM University — ^{211}At is a promising nuclide for cancer treatment with a 7.2 h half-life and 5.9 MeV α-emission. It is produced in a cyclotron by irradiation of metallic bismuth in the reaction ^{209}Bi(α, 2n)^{211}At. However, prior to radiotherapy, astatine must be separated from the target. In order to perform this separation, bismuth behavior under astatine separation conditions must be understood and therefore is of medical relevance. To address this issue, the extraction of the radioactive tracer isotope ^{207}Bi ($T_{1/2}$ = 32.2 y) from varying nitric acid concentrations into an array of organic solvents is examined in this work. ^{207}Bi is used in place of ^{209}Bi due to the increased sensitivity the radioactivity of ^{207}Bi provides while maintaining the same behaviors in solution. The organic solvents used include 1-octanol and hydrophobic liquid binary mixtures consisting of combinations of DL-menthol, methyl anthranilate, ibuprofen, lidocaine, and Proton Sponge^{TM}. For each solvent, the partition of ^{207}Bi between aqueous and organic phases has been measured and summarized in distribution ratio curves as a function of initial nitric acid concentration. The shape of these curves provides insight into the mechanism and efficacy of extraction. The results of this work will be presented.

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