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Isolation of ^{211}At from bismuth target in nitric acid media using hydrophobic organic solvents AMY VONDER HAAR, Texas AM Cyclotron Institute Montclair State University Department of Chemistry and Biochemistry, E.E. TERESHATOV, Texas AM Cyclotron Institute, J.D. BURNS, Nuclear Engineering and Science Center, Texas AM University, L. MCCANN, Texas AM Cyclotron Institute Department of Chemistry , L.A. MCINTOSH, G. TABACARU, Texas AM Cyclotron Institute, S.J. YENNELLO, Texas AM Cyclotron Institute Department of Chemistry — Astatine-211 is a promising nuclide for medical applications with a 7.2 h half-life and 5.9 MeV α-emission. It has been produced at the Texas A&M University Cyclotron Institute via irradiation of metallic bismuth in the reaction ^{209}Bi(α, 2n)^{211}At using a 28.8 MeV α-particle beam. To harvest ^{211}At, the target is dissolved in HNO_3 and the ^{211}At extracted via liquid-liquid extraction. Removal of target impurities is of critical medical relevance. A suitable solvent must extract the desired ^{211}At while leaving behind harmful contamination. Traditional solvents have been used to extract ^{211}At from the target solution including ether, alcohols, and ketones to explore the effect of changing functional groups. Greener solvents including methyl anthranilate, and hydrophobic liquid binary mixtures consisting of combinations of methyl anthranilate, ibuprofen, and lidocaine have also been explored, as well as the effects of oxidizing or reducing agents. For each solvent system, the partition of ^{211}At and bismuth, tracked as ^{207}Bi, between aqueous and organic phases has been measured and summarized in distribution ratio curves as a function of initial HNO_3 concentration. These curves provide insight into the efficacy of extraction.

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