

Public Abstract

First Name:Anthony

Middle Name:James

Last Name:DeGraffenreid

Adviser's First Name:Silvia

Adviser's Last Name:Jurission

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:Arsenic for Potential Diagnostic Imaging and Radiotherapy

Arsenic-72 (^{72}As ; 2.49 MeV positron, 26 h) and ^{77}As (0.683 MeV beta particle, 38.8 h) have nuclear properties useful for positron emission tomography (PET) and radiotherapy applications. Their half-lives are sufficiently long for targeting tumors with peptides and antibodies. Potential radioarsenic radiopharmaceuticals require identification of suitable bifunctional chelates for development of compounds stable under in vivo conditions at high dilution. The thiophilic nature of arsenic led to the synthesis and characterization of aryl arsenite dithiolate precursors to no-carrier added $^{72,77}\text{As}$ complexes. Additionally, the synthesis and no-carrier added labelling of a simple trithiol ligand with ^{77}As , and synthesis of two linkable trithiocyanate precursors, a carboxylic acid, and "clickable" alkyne, are described in detail.