ABSTRACT

DEVELOPMENT OF A NEW RADIONUCLIDE GENERATOR
BASED ON $^{118}$Te/$^{118}$Sb

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The development of a new radionuclide generator, based on $^{118}$Te/$^{118}$Sb, has been studied. The 3.5-minute $^{118}$Sb daughter activity decays principally by positron emission and has potential use as a flow tracer. The $^{118}$Te parent is conveniently produced by proton bombardment of antimony targets. A simple and efficient scheme for the separation of radiotellurium from proton-irradiated antimony targets has been developed. The overall recovery of radiotellurium was found to average 76%, with an estimated radiochemical purity of >99%.

The adsorption and elution characteristics of activated carbon and other materials have been evaluated for use as a column chromatography adsorbent in a $^{118}$Te/$^{118}$Sb generator. The conditions for optimal $^{118}$Sb elution and minimal $^{118}$Te breakthrough were found for activated carbon columns employing a mobile phase containing 3.5 mM NaClO and 0.08 M borate buffer (pH=7.8), or a 7.1 mM NaClO solution buffered with bicarbonate. An $^{118}$Sb elution yield of over 90% and radiotellurium breakthrough of less than 0.1%/mL have been achieved.