SEPARATION OF Tl/III/ FROM Tl/I/

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A method for the separation of Tl/III/ from Tl/I/ is reported employing 1-/2-pyridylazo/-2-naphthol /PAN/ and Rhodamine-B as extracting agents.

INTRODUCTION

Importance of the separation of two oxidation states of an element and also a procedure of the separation of Tl/I/ and Tl/III/ have been earlier reported. The above method was successfully utilized for a few redox sub-stoichiometric determination of thallium. The method, which was based on the extraction of Tl/III/ into iso-amyl acetate from an aqueous phase in 1.7M HCl and 10% volume by acetone. Tens of micrograms of Tl/III/ have been separated. Extraction of Tl/III/ using PAN and Rhodamine-B has been reported. Hitherto either a de-

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tailed extraction behaviour of Tl/I/ or the separation of the two oxidation states have not attempted employing these reagents. Only Tl/III/ but not Tl/I/ is expected to form an ion-association complex with Rhodamine-B, which could be easily extractable into benzene. Similarly PAN forms an extractable complex with Tl/III/ from acetate buffers which is extractable into chloroform. Hence, the present investigation is designed to develop a separation procedure for Tl/III/ from Tl/I/ employing a complexing agent 1/-2-pyridylazo/-2-naphthol and also the one based on ion association, Rhodamine-B.

EXPERIMENTAL

Preparation of solutions and reagents

Tl/I/ stock solution was prepared by dissolving 124.28 mg of Tl2SO4 in 100 ml containing 1 ml of sulphuric acid. The thallium content of the solution was determined by the method of Erdey et al.12 /1 mg/ml/.

Thallium-204 /T = 3.78 y/ was obtained as thallium/I/ sulphate in sulphuric acid with a specific activity of 188 mCi/g of Tl from M/S Isotope Division Bhabha Atomic Research Centre, Bombay.

Tl/I/ active solution was prepared by adding 20 μl of tracer to 1 ml of stock solution and diluted to 100 ml to give a solution containing 10 μg of Tl/ml.

Tl/III/ active solution was prepared by adding 20 μl of tracer to 1 ml of stock solution and oxidized with bromine, excess of which was removed by boiling. The solution further was diluted to 100 ml to get 10 μg of Tl/III//ml.

PAN stock solution was prepared by dissolving 50 mg of PAN in 50 ml methanol and was diluted to give 4.012x10^-4 M solution for use.