

Geochemical Study on Strontium-90 Fallout during 1954-1960

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Introduction

As a result of fallout from nuclear test explosions, small quantities of fission products now widely have been disseminated. Further, the possibility of their regulated or accidental discharge must be taken into account in planning peaceful nuclear operations. Therefore, at first a simple and rapid method for routine analysis must be developed for radiostrontium at very low concentration in wide variety of environmental samples, because the isotope strontium-90 represents a major part of the radiation hazard to man caused by nuclear operations by reason of its long half-life (28 years). Secondly, the rate of strontium-90 fallout depends to a large extent on the geographical locality and on the weather conditions. There is evidence that in the northern hemisphere places with high rate of precipitation receive the high fallout. These conditions hold obviously for Japan. The present work was undertaken to establish a rapid method of the determination of radiostrontium in a fallout sample and to obtain more reliable information as possible on the geochemical behavior of strontium-90 in the atmosphere and its rate of deposition in Niigata, Japan.

Part I. Determination of Radiostrontium in the Fallout Sample by Ion Exchange Method.

In the determination of a radionuclide at low levels of activity, various factors must be taken into consideration. First, to obtain a detectable amount of activity a large sample must be processed. Second, the separated isotope should be obtained in high yield and with a good degree of purity. Third, the radiations being measured should be detected with high efficiency. This will depend not only on the instrumentation, but also on the method of a sample preparation.