

Fig. 2. Calibration curves of magnesium for the first (○) and second (●) irradiations

activity of magnesium-27 of the standard magnesium from the second irradiation; *Wst.*, weight of standard magnesium for the second irradiation (g).

An example of the γ -ray spectrum of magnesium-27 which was measured after being extracted with oxine-benzene solution is shown in Fig. 1, and the calibration curves of magnesium for the first and second irradiations and results of analyses by this method are shown in Fig. 2 and Table 1, respectively.

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¹ Kamemoto, Y., and Yamagishi, S., *J. Chem. Soc. Japan, Pure Chem. Sec. (Nippon Kagaku Zasshi)*, **84**, 291 (1963).

² Kamemoto, Y., and Yamagishi, S., *Bull. Chem. Soc. Japan* (in the press).

³ Kamemoto, Y., and Yamagishi, S. (to be published).

Thorium Content of, and its Separation from, Commercially Available Pure Lutetium Oxide

In connexion with the half-life standardization of lutetium-176 (half-life = 2.2×10^{10} yr.) a 1-g quantity of commercially available lutetium oxide was obtained having a purity of 99.9 per cent. (Standardization work was carried out by Mr. Donhoffer of the Institut für Radiumforschung und Kernphysik, Vienna 9.) During measurement, however, it soon became evident that other activities were also present and in sufficiently large quantities to make the proposed measurement impossible. The sample was, therefore, subject to a nuclear spectroscopic analysis by means of a 400-channel pulse height analyser for a 26-h period. The results of this analysis (Fig. 1) clearly indicated the presence of several activities resulting from the decay of thorium, the decay scheme for which is shown in Fig. 2.

It became obvious, from the results of the analysis, that a chemical separation of the thorium and radium content would be necessary before any attempt at the desired standardization could be undertaken. Given in the following is a description of the separation procedure developed for this purpose.

In order to separate the thorium, the lutetium oxide was first dissolved in 2 N hydrochloric acid and adsorbed on a cation-exchange resin, of the type 'Dowex 50 W-X 8' with a 100–200 mesh size, in the NH_4^+ -form. The lutetium was eluted with 100 ml. of 4 N hydrochloric acid and the column washed out with 100 ml. of water.

In the case of radium, 25 mg of barium in the form of barium chloride were added to the lutetium and the radium co-precipitated with barium following the addition of sulphuric acid.

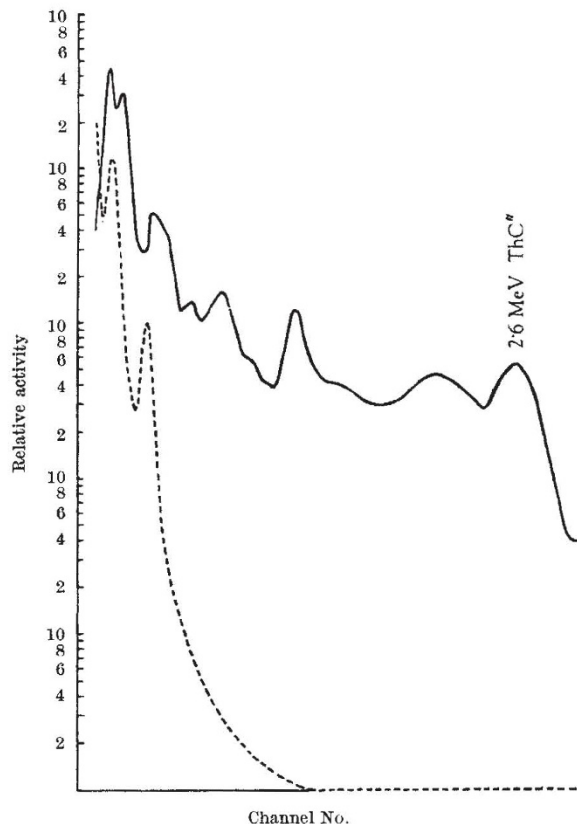


Fig. 1. Gamma spectrum of lutetium-176 showing impurities present before ion-exchange separation (continuous line) and their removal after separation (broken line)

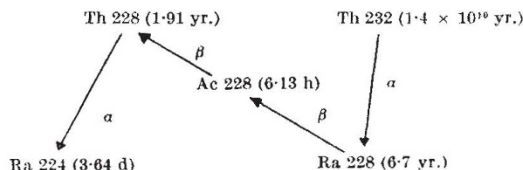


Fig. 2. Decay scheme of thorium

Finally, the lutetium was precipitated with oxalic acid and converted to the oxide in a muffle furnace at 800° C.

The lutetium was again subjected to analysis using the 400-channel analyser for a 26-h period and, as can be seen from Fig. 1, only lutetium-176 is present indicating the success of the described separation.

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Radiolysis of Cyclohexane + Benzene Mixtures at Liquid Nitrogen Temperature by Cobalt-60 γ -Rays

THE discovery by Manion and Burton¹ of the inhibiting properties of benzene in the radiolysis of cyclohexane + benzene mixture has given rise to numerous investigations on this system in both liquid and gas phase²⁻⁴. The results obtained show that the hampering of radiolysis may be explained by the energy transfer from cyclohexane to benzene and that the mechanism of this process is similar in liquid and gas phase.

The purpose of the work recorded here was to investigate the mechanism of energy transfer in the same system but in solid phase. De-aerated samples of cyclohexane +