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Half-Life of Lutetium-176 Based on the Ratio Lu-176/Hf-176 from two Minerals Dated by the Pb-U Method

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SUMMARY

Lutetium and Hafnium measurements on rare earth minerals have been carried out by stable isotope dilution techniques in microgram amounts. The analysed minerals were a gadolinite from Iveland (Norway) and a priorite from Mitwaba (Katanga), both dated by concordant U/Pb ages respectively to 900 ± 20 million years and 1080 ± 50 m.y. (LEDENT et al., 1956; EBERHARDT et al., 1956).

The mean results of several determinations are the following:

	Lu ppm	Hf ppm	Hf-176rad	$\frac{\text{Hf-176rad}}{\text{Hf-176tot}}$ %	T 10^{10} y.
Gadolinite	2.134 ± 60	30.2 ± 3	0.96 ± 0.15	38 ± 2.8	3.5 ± 0.7
Priorite	1.089 ± 30	3.04 ± 0.34	0.65 ± 0.06	81 ± 7	3.2 ± 0.5

The errors correspond to a 95% confidence level.

A half-life for the β decay of Lu-176 of $3.3 \pm 0.5 \times 10^{10}$ y. is thus decuced. This resuld is in good agreement with a recent value of 3.6×10^{10} y. obtained by three different counting methods on purified natural lutetium (BRINKMAN et al., 1965). It is very discordant from the value of $2.17 \pm 0.35 \times 10^{10}$ y. obtained by the first geologic determination of the half-life on a gadolinite from the same pegmatite by HERR et al. (1958).

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