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LETTER TO THE EDITOR

The half-life of the first excited state of ^{111}Cd

The decay of ^{111}In by electron capture to a 419 keV level in ^{111}Cd is followed by a cascade of two gamma transitions, one of 172 keV leading to a 247 keV level and one of 247 keV to the ground state. The half-life of the 247 keV level is known to be in the 10^{-7} sec region. Therefore this isomer has been selected to check the performance of the delayed coincidence arrangement which was to be employed in a determination of the half-life of ^{57}Fe^{m}, described elsewhere [1]). As the accuracy of the measurement of the half life of the 247 keV level is fairly high, the results are worth publishing.

The mother substance ^{111}In was prepared by α-particle bombardment of a pure silver target in the Philips cyclotron at Amsterdam. This target was used in the present experiment without chemical purification. The experimental equipment used in this investigation has been described in a previous publication [2]). It consists of two scintillation counters in coincidence. Between the scintillation counter and the fast amplifier (see Fig. 2 of [2])) fed by the 172 keV pulses, delays between 0.088 and 0.44 μsec were inserted in steps of 0.088 μsec. The second counter was fed by the 247 keV pulses of the isomeric transition.

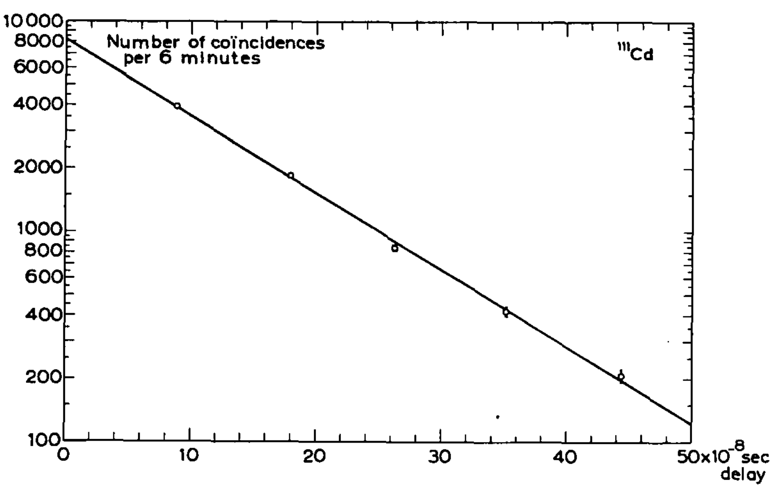

Fig. 1. Number of coincidence counts as a function of the delay.

For the delay, coaxial cables of 1900 Ω characteristic impedance were used. The delay in the cables has been accurately (2% error) determined by measuring several of their resonance frequencies with a rf generator of variable frequency.

Three different runs were made, one of them is presented in Fig. 1. A statistical treatment of the measured coincidence counts resulted in a value of $(8.5 \pm 0.2) \times 10^{-8}$

sec for the half-life of the 247 keV isomer of ^{111}Cd, in agreement with previous results: $(8.6 \pm 0.4) \times 10^{-8}$ sec [3]), and $(8 \pm 1) \times 10^{-8}$ sec [4]).

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