The Decay of 25-Minute $^{131}$Te$^\gamma$.

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Several studies have been made of the decay $^{131}$Te$^\gamma \to ^{131}$I, the most recent being by DEVARE, TANDON and DEVARE (1) and WALTERS, BEMIS and GORDON (2). In the latter work the authors made a Ge(Li)-NaI(Tl) coincidence study of the $^{131}$I $\gamma$-rays and from the results suggested the decay scheme shown in Fig. 1.

The present work, completed before the paper of Walters et al. has appeared, is an attempt to elucidate the spins of the 603 and 1147 keV levels by $\gamma$-$\gamma$ angular correlation. Preliminary work, however, involved a rather thorough NaI(Tl) spectrometer investigation of the singles' spectrum of the $^{131}$I $\gamma$-rays, and an account of this will first be given.


Isotopically enriched $^{130}$Te (98.9% pure) was obtained from the Electromagnetic Separation Group at A.E.R.E., Harwell. $\frac{1}{4}$ mg samples were sealed into thin quartz tubes and these irradiated for 20 minutes at pile factor 10 in the D.I.D.O. reactor. No interference from the 1.2-day $^{131}$Te$^m$ or the 8-day $^{131}$I decays could be traced throughout the measurements.

2. Apparatus.

The angular-correlation equipment was a standard fast-slow circuit (see (3)), and the singles' spectra were examined by a 100-channel analyser (A.E.R.E. type 1524 c).

3. Singles' spectrum.

The singles' spectrum was studied both by $(1 \times 1\frac{1}{2})$ in. and $(3 \times 3)$ in. unscreened crystals. These two measurements were made in an attempt to check the over-all accuracies of the intensities. The resolutions of the spectrometer for the two crystals for the 661 keV line of $^{137}$Cs were 9.7% and 14%, respectively.

For the actual intensity determinations, the sources were placed at 3 cm

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from the front surface of the $(1 \times 1 \frac{1}{2})$ in. crystal and 10 cm from that of the $(3 \times 3)$ in. crystal. However, to eliminate the possibility of build-up peaks being present, the $(1 \times 1 \frac{1}{2})$ in. spectra were compared with those taken at 7 cm and 14.5 cm for the $(1 \times 1 \frac{1}{2})$ in. crystal. No significant changes were observed.

The singles measurements were sandwiched between calibration runs made with the standard sources $^{51}$Cr, $^{198}$Au, $^{137}$Cs, $^{54}$Mn, $^{65}$Zn and $^{22}$Na.

A spectrum-stripping procedure was used to calculate the relative photopeak intensities of the $\gamma$-rays. Data for the peak/total ratios and efficiencies for the $(1 \times 1 \frac{1}{2})$ in. crystal were obtained from Reiler and Bell (4). Those for the $(3 \times 3)$ in. crystal were from Heath (5). A comparison of the results of the singles' spectrum analysis for the two crystals is shown in Table I. The errors quoted

(4) J. H. Reiler and P. R. Bell: $\alpha$, $\beta$ and $\gamma$ Ray Spectrometry, vol. 1, ch. 5, edited by K. Siegbahn (Amsterdam, 1965).