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LETTER TO THE EDITOR

The disintegration energy of ^{51}Cr.

The disintegration of 28d ^{51}Cr proceeds for 92% by K-capture to the ground state of ^{51}V. An 8% branch goes to an excited state which decays by a 323 keV gamma transition (1).

In order to find the disintegration energy of ^{51}Cr, the internal bremsstrahlung spectrum of the main branch was detected and its relative intensity measured. As the 323 keV gamma transition greatly exceeds the bremsstrahlung in intensity, the latter was reduced by absorption to less than 2% of the original value. For this purpose lead

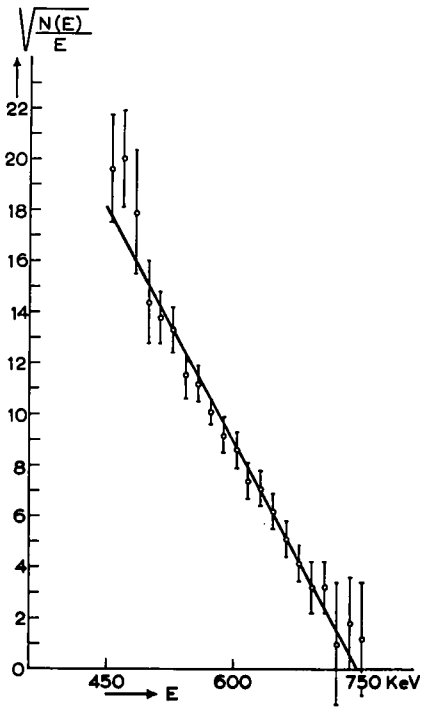

Fig. 1. Representation of $\sqrt{N(E)/E}$ for the high energy part of the internal bremsstrahlung spectrum of ^{51}Cr. The straight line indicates the least squares average linear function

slices of 1.58 and 1.95 cm were inserted between the 5 mC source, obtained from A.E.R.E., Harwell, and a $1^5/_8$" × 2" ø thallium-activated sodium iodide crystal (Harshaw) which was mounted on a Dumont 6292 photomultiplier. The total gain of

multiplier and subsequent amplifier was stabilized by a device of a type as indicated by De Waard (2). The stabilisation obtained is better than 0.5%.

After amplification the pulse spectrum was analysed by a 70-channel kicksorter of the Hutchinson-Scarrott-type. Sources of ^{54}Mn and ^{137}Cs were used for energy calibration. Corrections for pile-up, for the remainder of the 323 keV photopeak and for counter background were applied down to 450 keV and the contribution of the Compton effect was calculated from the spectrum of calibration sources and subtracted from the corrected spectrum. If the intensity at energy E is $N(E)$ then, according to theory (3), $\sqrt{N(E)/E}$ must be a linear function of E for the higher energy part of the spectrum. Using this relation, the most-probable endpoint energy E_{max} was then calculated by a least-square calculus.

Three runs were made, one of which yielded the results given in Fig. 1. The respective endpoints were: 751 $\pm$ 38 keV, 747 $\pm$ 38 keV and 740 $\pm$ 38 keV. To the average value, 746 $\pm$ 22 keV, the K-binding energy of vanadium must be added to find a value of 752 $\pm$ 22 keV for the ^{51}Cr $-$ ^{51}V mass difference. In comparison with the recent value of 780 $\pm$ 50 keV given by Cohen and Ofer (4) and obtained by a method similar to the one described in this letter the present result is in better agreement with the ^{51}V(p, n)^{51}Cr reaction energy measurement by Richards, Smith and Browne (5) from which a mass difference of 750 $\pm$ 6 keV is calculated.

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