Radiations From ^{178}W .

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The activity of ^{178}W was observed by WILKINSON ⁽¹⁾ in bombardment of tantalum with protons of energy greater than about 25 MeV. By means of absorption measurements the decay was found to occur through orbital electron capture. The presence of a weak γ -ray of 0.270 MeV was also noticed ($\gamma/KX=0.02$). ^{178}W ($T_{\frac{1}{2}}=21.5$ d) is in equilibrium with its daughter ^{178}Ta ($T_{\frac{1}{2}}=9.35$ m). According to the results of WILKINSON the decay of ^{178}Ta occurs through orbital electron capture (94%) and β^+ emission (6%); the decay gives rise to a weak γ transition of 1.5 MeV energy ($\gamma/KX=0.03$).

A hafnium oxide target has been irradiated in the Amsterdam cyclotron with 52 MeV α -particles. Tungsten carrier was added to the irradiated sample, and then an extraction of tungsten was made. The W fraction, on investigation with a single crystal scintillation spectrometer, was found to be active. After the disappearance of short-lived activities the γ spectrum studied with a twenty channel electronic pulse analyser, showed the presence of a peak at 56.5 ± 1.5 keV

energy. The intensity of this peak was followed over 200 days. The decay curve appears to be complex and can be easily broken into two straight portions. The corresponding half-lives are:

$$(T_{\frac{1}{2}})' = 22.0 \pm 0.5 \text{ d}$$

and

$$(T_{\frac{1}{2}})'' = 145 \pm 5 \text{ d}.$$

The two activities were therefore attributed respectively to ^{178}W and ^{181}W ; (^{181}W is known to decay by orbital electron capture, $T_{\frac{1}{2}}=140$ d) ^(2,3). The ratio of the two activities after the irradiation is about: 4:1.

No γ -rays were observed in the energy regions around 0.270 MeV, 0.511 MeV (positron annihilation radiation) and 1.5 MeV. If present, these γ -rays would have an intensity relative to the KX -radiation, respectively lower than $6 \cdot 10^{-3}$, 10^{-2} , $1.4 \cdot 10^{-2}$. In estimating these upper limits the detection efficiency was taken into account. The rather high values of these upper limits are due to the weakness of the active sample.

⁽¹⁾ G. WILKINSON: *Phys. Rev.*, **80**, 495 (1950).

⁽²⁾ G. WILKINSON: *Nature*, **160**, 864 (1947).
⁽³⁾ A. BISI, S. TERRANI and L. ZAPPA: *Nuovo Cimento*, **1**, 651 (1955).