agree with the earlier conclusion that it is much less than μ', at least in the megacycle range. Typical values on a polymer A', similar to polymer A at 25°C, are found in Table I. Some measurements on higher molecular weight polymers seem to indicate larger λ' values, always, however, much less than μ'. Accordingly, it has been possible, at least in several cases, to account quantitatively for the attenuation of logitudinal waves in liquids by a shear viscosity.

Radiations from Te^{121}

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According to previous work in this laboratory,[1] Te^{121} decays by two isomeric transitions, namely, a highly converted γ-ray transition of approximately 50 kev of 143-day half-life followed by a partly converted 220-kev γ-ray of approximately 5×10^{-8}-sec. half-life.[2] The Te^{121} in its ground state then decays by K-electron capture of 17-day half-life[3] into Sb^{121} which subsequently emits a partly converted 610-kev γ-ray.

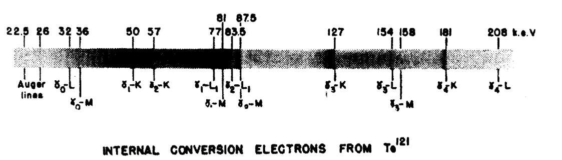

Fig. 1. Internal conversion electrons from Te^{121}.

In the present experiments we set out to measure more accurately the energies of the electrons involved in the 143-day transition. A Te^{121} source of the order 0.1 mg/cm² and 0.01 millicurie was inserted in a 180-degree focusing β-ray spectrograph,[4] and a number of spectra were taken during a period of about 5 months. The spectrum, which is shown in Fig. 1, turned out to be more complex than was anticipated and was found to contain 18 lines, indicating with certainty the presence of 4 transitions of energies: 82, 88.5, 159, and 213 kev. There is also the possibility of a 36.5-kev transition, based on the assumption that the 32.4- and 34.9-kev conversion lines are due to L- and M-conversions. The K-conversion which would lie at approximately 5 kev was not found, and this may be due to either experimental conditions or may be consistent with theory if the transition is weak and of high angular momentum change. The observed conversion lines and their assignments are shown in Table I.

Table I. Conversion electron spectrum of Te^{121}.

B_ρ (oersted-cm)	Line energy (kev)	Assignment	γ-ray energy (kev)
504.9	22.2	$K\alpha_1-L_I$	22.2+ 4.95 = 27.15
544.6	25.6	$K\beta_1-L_I$	25.6+ 4.95 = 30.55
616.9	32.4	γ_0-L	32.4+ 4.35 = 36.75
641.3	34.9	γ_0-M	34.9+ 1.0 = 35.9
774.7	50.3	γ_1-K	50.3+31.8 = 82.1
824.6	56.5	γ_2-K	56.5+31.8 = 88.3
970.2	77.0	γ_1-L_I	77.0+ 4.95 = 81.95
974.2	77.3	γ_1-L_{III}	77.3+ 4.35 = 81.65
995.6	80.6	γ_1-M	80.6+ 1.0 = 81.6
1016	83.8	γ_2-L_I	83.8+ 4.95 = 88.75
1019	84.1	γ_2-L_{III}	84.1+ 4.35 = 88.45
1041	88.0	γ_2-M	88.0+ 1.0 = 89.0
1278	127.3	γ_3-K	127.3+31.8 =159.1
1422	154.9	γ_3-L	154.9+ 4.95 =159.85
1448	159.4	γ_3-M	159.4+ 1.0 =160.4
1557	181.2	γ_4-K	181.2+31.8 =213.0
1689	208.7	γ_4-L	208.7+ 4.95 =213.65
1706	212.2	γ_4-M	212.2+ 1.0 =213.2

We have also obtained the relative intensities of the conversion lines and followed their decay. The relative sensitivity of the spectrographic film was first calibrated as a function of exposure and of electron energy using the known number-energy distribution of the β-rays from P^{32}.

It has been found that the intensities of all the conversion lines decay with a half-life of approximately 143 days, and that there is no contribution to their intensities from the 17-day activity. It therefore seems probable that all four transitions, including the 82 and 88.5 kev which have been previously assigned[5] to 30-day $Te^{122 \text{ or } 124}$, belong to Te^{121}.

The K- to L-conversion ratios for the 82-, 88.5-, 159-, and 213-kev transitions have been determined as 0.77, 0.92, 7.7, and 4.2, respectively. Following the theoretical analysis of Hebb and Nelson,[6] the effective angular momentum changes associated with 2^l-electric multipole transitions can now be obtained, and are closest to: $l=3$ for 82 kev, $l=3$ for 88.5 kev, $l=2$ for 159 kev, and $l=3$ for 213 kev. The associated lifetimes, allowing for electric multipole conversions, are of the order 3×10^{-4} sec., 2×10^{-4} sec., 1.5×10^{-9} sec., and 10^{-5} sec., respectively.

The relative intensities of the conversion electrons from all shells of the separate 82-, 88.5-, 159-, and 213-kev transitions are 87, 100, 16, and 12, respectively. The intensities of the 32.4- and 34.9-kev lines of the nominae 36.5-kev transition are only 0.3 and 1.0, on the saml arbitrary scale.

There appears to be no obvious scheme in which the observed transition energies can be combined. In particular, one cannot conclude from these experiments which transition is responsible for the 143-day half-life, as the 36.5-kev transition alone has too low an intensity to precede the other transitions.

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