SHORT COMMUNICATIONS

Ammonium Molybdate as a Dosimeter for γ-Radiations

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It is known[1,2] that acidic ammonium molybdate solutions in alcohol are reduced to blue-bluish green compounds, when exposed to ultraviolet radiation. In what follows, a new and simple chemical dosimeter in the range 10^4—10^7 R (10^{18}—10^{21} eV/g) using ammonium molybdate solutions has been described.

A stock solution of ammonium molybdate (E. Merck) was prepared by dissolving five grams of it in a little water and then 25 m*l* of concentrated hydrochloric acid was added and made up to 1000 m*l*. To 100 m*l* of this solution, 20 m*l* of alcohol or tetrahydrofuran (in which the solutions are very stable) were added, and 10 m*l* of these solutions were exposed to a 1000-curie Co-60 source (γ-cell 220, AEEC, Canada), After exposure to γ-radiations, the reduced solutions (blue) were estimated using both (a) titrimetric- (5 m*l* of the solution was titrated against standardised 0.00985 N potassium permanganate until the blue tinge disappeared) and (b) spectrophotometric- (the absorption maximum obtained at 690 mμ was followed) methods.

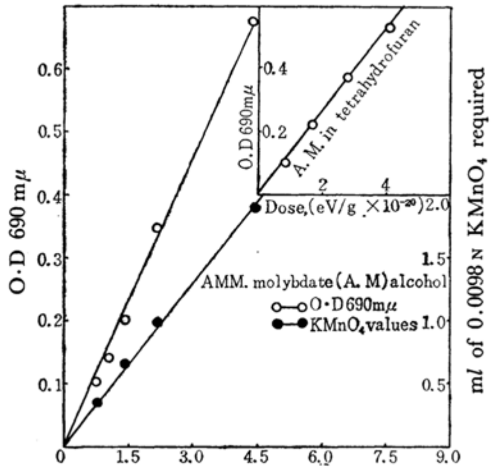

Fig. 1. Dosimetry curves for Ammonium molybdate in alcohol and tetrahydrofurum.

It is seen from the figure that in the range 10^4—10^6 R (10^{18}—10^{20} eV) reduction of ammonium molybdate (to most probably a mixture of its oxides MoO_3 and Mo_3O_8) is linear with dose in alcohol solutions. A similar linearity is observed with tetrahydrofuran in the range 10^5—10^7 R (10^{19}—10^{21} eV/g).

This dosimeter has two advantages in that (i) it can be used selectively over the range 10^4—10^7 R by choosing the proper solvent and (ii) can easily be estimated either by taking the absorption spectra or titrating against potassium permanganate.

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[1] T. Imai, *Rev. Phys. Chem.* (Japan), **12**, 62 (1938).

[2] S. K. Bhatacharya, K. R. Kar and A. R. Sur, *J. Indian Chem. Soc.*, **19**, 510 (1942).