

A CHEMICAL DOSIMETRY SYSTEM WITH A WIDE
RANGE OF RADIATION DOSIMETRY POSSIBILITIES

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Wide expansion of the use of nuclear radiation has made chemical dosimeter an essential item that is widely used in industry as well as in health and research. Different applications of radiation need different doses of radiation varying by orders of magnitude. Each chemical dosimetry system normally operates over a limited range of radiation doses. Early chemical dosimeters were liquid solutions which were examined by spectro-photometric methods for calculation of the radiation dose. Now more convenient solid state dosimetric systems which confirms the delivery of a required radiation dose, for example in sterilization of medical products, have become available. The delivery of the required dose is usually indicated by a change of colour.

In our work we have found a system of three isomorphous trisoxalato complexes of Al^{3+} , Fe^{3+} and Co^{3+} , which have widely different radiation stabilities and which can be mixed in any proportion to obtain solid solutions. The energy transfer mechanisms operating among different molecules in these solid solutions enable us to control the relative change of colour per unit of radiation dose absorbed.

Paper impregnated with solid solutions of this system with different predetermined proportions of the three constituents could provide us a series of chemical radiation dosimeters useful in different ranges of radiation doses.