Kunz K. S. 1957 *Numerical Analysis* (McGraw Hill, New York) p. 204.

Madsen M. M. & Peek J. M. 1971 *Atomic Data* **2**, 171.

McCalla T. R. 1967 *Introduction to Numerical Methods and Fortran Programming* (John Wiley, New York) p. 226.

Thomas L. & Bowman M. R. 1974 *J. Atmos. Terrs. Phys.* **36**, 1411, 1421.

Von Busch F. & Dunn G. H. 1972 *J. Chem. Phys.* **56**, 3626.

Van Asselt N. P. F. B., Maas J. G. & Los J. 1974 *Chem. Phys. Lett* **24**, 555; 1974 *Chem. Phys.* **5**, 429.

Zare R. N. & Cashion J. K. 1963 Univ. California Radiation Lab. Report No. UCRL-10881 (unpublished).

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Dependence of a TL glow peak intensity on irradiation dose in CaS: Pd phosphors

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Traps in a phosphor, which store the part of absorbed energy during irradiation and give rise to phenomena like phosphorescence decay, thermoluminescence and thermally stimulated conductivity, are either created during irradiation or present prior to irradiation of the phosphor. However the information about this can be obtained by the study of variation of TL glow peak intensity with irradiation dose. Such studies also provide the information about the types of defects responsible for glow peaks. In this note we report the study of dose dependence of TL glow peak intensity made on CaS phosphors activated with varying concentration of Pd.

CaS phorphors containing varying concentration of Pd were prepared by the method of thermal reduction of purified gypsum as followed by Bhawalkar & Malhotra (1969). The samples studied contained 0.5, 0.1, 0.025, 0.0025 and 0.00 wt. % Pd. The experimental set-up and procedure followed in recording the glow curves were as described earlier (Lawangar & Narlikar 1975a). The excitation source used was a ultraviolet source which emitted predominantly the 3650Å Hg doublet. Each time sample was excited for a different period of time and a glow curve was recorded. The heating rate employed was 0.46°K/S.

Figure 1 shows a build-up curve for a sample containing 0.025 wt.% Pd. All the samples exhibit single glow peak in the temperature range of 300°K to 410°K and the peak position was at about 350°K. If the lattices vacancie acting as electron traps exist prior to irradiation, the filling obey the relation (Mitchell *et al* 1961)

$$n_t = n_0[1-\exp(-t/m)], \qquad \dots \quad (1)$$

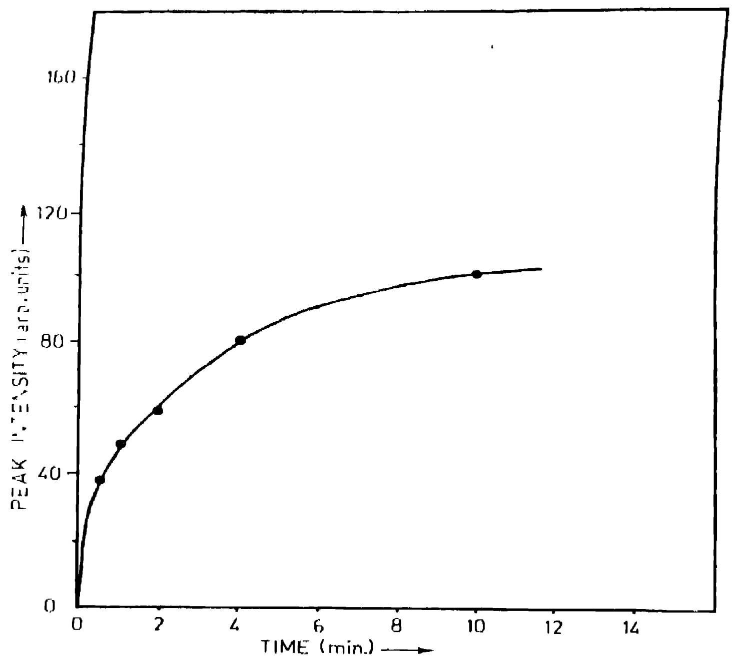

Fig. 1. Variation of glow peak intensity with excitation time.

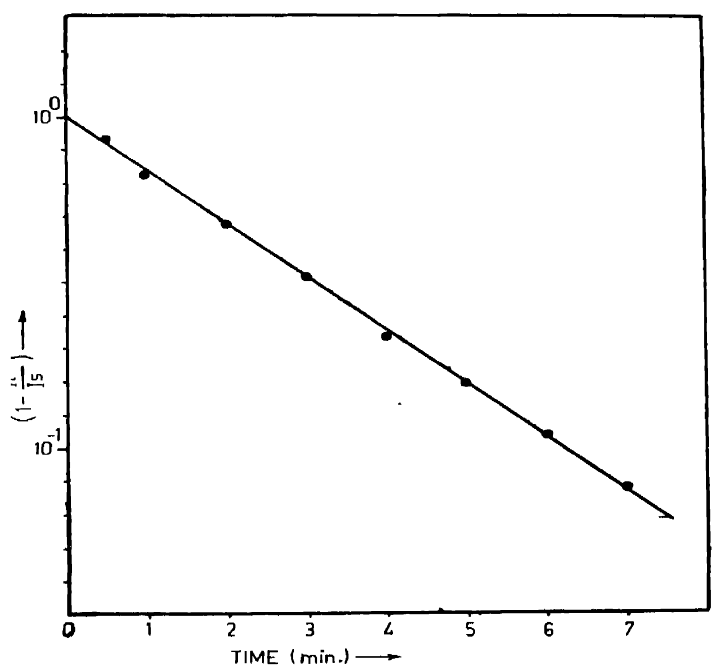

Fig. 2. Plot of $\log[1-(I_t/I_s)]$ versus excitation time.

where n_t is the density of filled traps per cubic centimeter at time t, n_0 is the total number of traps per cubic centimeter and m is the time constant. The equation (1) can be put up in the form

$$\ln [1-(n_t/n_0)] = -t/m. \qquad \ldots \quad (2)$$

Thus a plot of $\ln [1-(n_t/n_0)]$ versus t is a straight line having slope equal to $1/m$. A plot of $\ln [1-(n_t/n_0)]$ versus t for a sample containing 0.025 wt. % Pd is shown in figure 2 and is obtained by assuming that the peak intensity I_t after irradiation for time t is proportional to the filled traps and n_0 is given by the plateau level I_s of the buildup curve (Pawar & Narlikar 1974). From figure 2 it may be seen that the plot is nearly a straight line. The graphs obtained for other samples are also found to be almost linear. Thus these results indicate that the traps in the present system of phosphors exist prior to irradiation and are lattice vacancies. The values of m calculated from the slopes of the straight lines are practically same for all samples. This suggests that the types of defects acting as electron traps are of the same nature. These defects, as earlier investigation had shown, are likely to be the sulphur vacancies (Lawangar & Narlikar 1975b).

REFERENCE

Bhawalkar D. R. & Malhotra B. R. 1969 *Indian J. Pure Appl. Phys.* **7**, 163
Lawangar R. D. & Narlikar A. V. 1975a *J. Luminescence* **11**, 135.
Lawanger R. D. & Narlikar A. V. 1975b *J. Mater. Sci.* **10**, 1251.
Mitchell P. V., Wiegand D. A. & Smoluchowski D. R. 1961 *Phys. Rev.* **121**, 484.
Pawar S. H. & Narlikar A. V. 1974 *J. Luminescance* **9**, 52

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Charge-symmetric potentials and the hypertriton

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A choice of suitable potentials has been made for the ΛN charge-symmetric parameters of Herndon and Tang to yield a reasonable value for Λ-separation energy in ${}_{\Lambda}{}^{3}$H.

Recently two papers (Schick 1975, Gibson & Lehman 1975) have appeared regarding the Λ-binding (B_{Λ}) in ${}_{\Lambda}{}^{3}H$, obtained from two sets of Λ-nucleon potentials (model A and model B) derived from the low-energy-parameters of Nagels, *et al* (1972). According to the analysis of Schick (1975) both, model A and model