

substance: MoO₃

property: optical properties, dielectric constants

refractive index

| | | | | |
|----------------------------|------|-----------------|--|-----|
| $n_{\alpha} (\parallel b)$ | 1.88 | values obtained | wavelength dependence: Fig. 1 | 68D |
| $n_{\beta} (\parallel a)$ | 2.29 | using Na | | |
| $n_{\gamma} (\parallel c)$ | 2.54 | "D" line | | |
| n | 2.30 | | extrapolated, thin film, close to average value (2.24) | |

absorption coefficient: see Figs. 2, 3.

static dielectric constant

| | | | | |
|------------------|-------|-----------------------|--|------|
| $\varepsilon(0)$ | 18(1) | $f = 1 \dots 40$ kHz, | $\varepsilon(\infty) = 5.31$ [68D], $= 5.70$ [66D] | 66D, |
| | | RT | | 68D |
| | 35(5) | RT | | 78S |
| | 17(1) | 1 kHz | | 64A |
| | 12(1) | 10 kHz, | | 78S |
| | | $T = 77$ K | | |

The optical spectra of Mo_{1-x}W_xO₃ also show a direct edge (Figs. 2, 3). For a range of x values, the band gap of Mo_{1-x}W_xO₃ exceeds both that of WO₃ (2.77 eV) and pure MoO₃ (3.05 eV), an effect ascribed to Anderson localization [79H].

References:

- 64A Ames, I., Gregor, L. V.: Electrochem. Technol. 2 (1964) 97.
- 66D Deb, S. K., Chopovrian, J. A.: J. Appl. Phys. 37 (1966) 4818.
- 68D Deb, S. K.: Proc. Roy. Soc. A304 (1968) 211.
- 78S Sayer, M., Mansingh, A., Webb, T. B., Noad, J.: J. Phys. C 11 (1978) 315.
- 79H Hoppmann, G., Salje, E.: Opt. Commun. 30 (1979) 199.

Fig. 1.

MoO₃. Refractive index vs. wavelength of a thin film [68D].

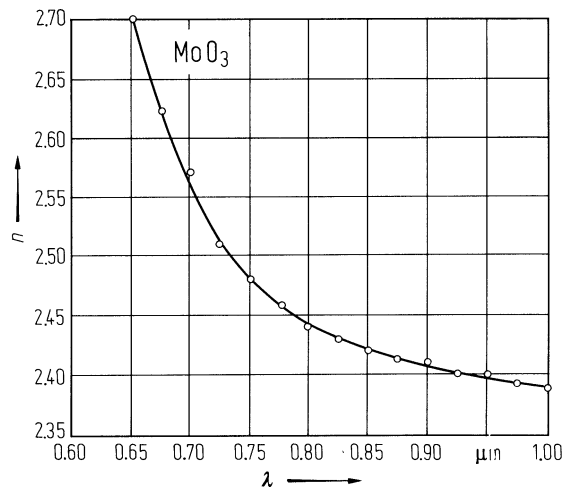


Fig. 2.

$W_{1-x}Mo_xO_3$. Absorption coefficient vs. photon energy for (1) WO_3 , (2) $W_{0.9}Mo_{0.1}O_3$, (3) $W_{0.63}Mo_{0.37}O_3$, (4) $W_{0.05}Mo_{0.95}O_3$ [79H].

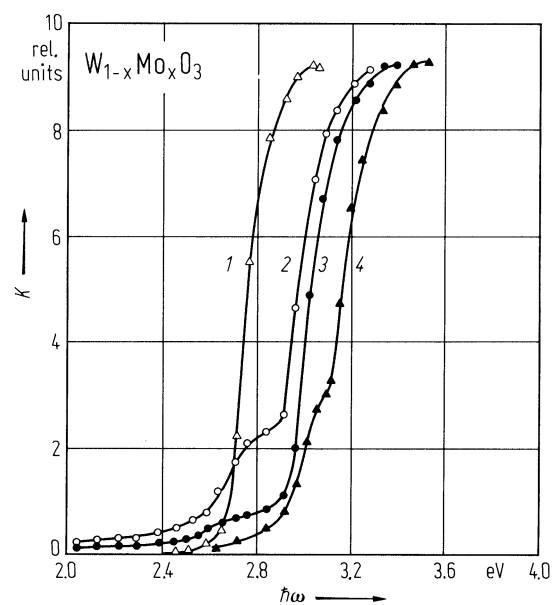


Fig. 3.

$W_{1-x}Mo_xO_3$. Absorption coefficient times photon energy squared vs. photon energy indicating direct optical transitions for (1) WO_3 , (2) $W_{0.9}Mo_{0.1}O_3$, (3) $W_{0.79}Mo_{0.21}O_3$, (4) $MoO_3:W$, (5) MoO_3 [79H].

