substance: MoO_3
property: energy gap

An analysis of the absorption coefficient – found to follow Urbach's rule in the threshold region ($10^2 < K < 10^4$ cm^{-1}) – gives the following data

β	0.21	$E \perp c$	parameters of the Urbach formula	68D
	0.24	$E \parallel c$		
E_0	3.23 eV	$E \perp c$	$K = K_0 \exp(-\beta (E_0 - h\nu)/kT)$	
	3.66 eV	$E \parallel c$	with $E_0 = E_\infty - CT$	
C	$6.2 \cdot 10^{-4}$ eV K^{-1}	$E \perp c$	for absorption spectrum near	
	$7.3 \cdot 10^{-4}$ eV K^{-1}	$E \parallel c$	threshold, see Fig. 1; for He I and He II spectra, see Fig. 2	
E_g	2.96 eV	$E \perp c$	analyzed from plot of K_2 vs. $h\nu$ at RT	68D
	2.80 eV	$E \parallel c$		
	3.05 eV	RT		79H

References:

68D Deb, S. K.: Proc. Roy. Soc. A304 (1968) 211.
78B Beatham, N.: D. Phil. Thesis (Oxford) 1978.
79H Hoppmann, G., Salje, E.: Opt. Commun. 30 (1979) 199.

Fig. 1.

MoO_3. Optical density vs. photon energy (wavelength) of a 44 μm thick single crystal for polarized light in the temperature range 150...340 K. The crystal was oriented with the (010) plane perpendicular to the incident light beam [68D]. $d_{opt} = \log(I_0/I)$

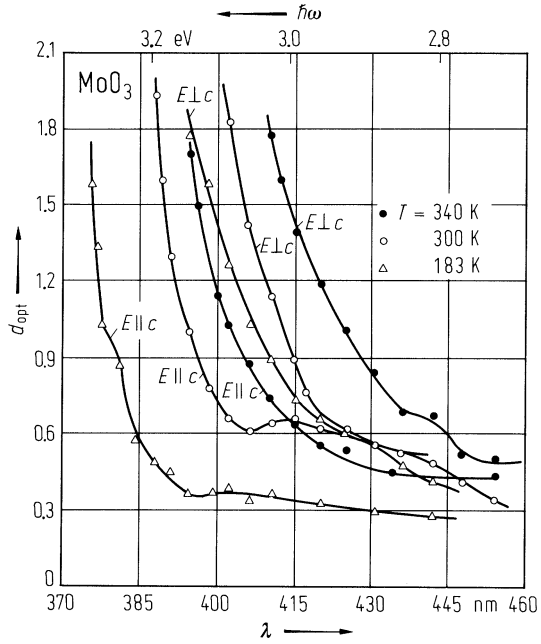

Fig. 2.

MoO_3. He I and He II spectra (photoelectron intensity vs. electron kinetic energy) [78B].