substance: YbS
property: crystal structure, physical properties

crystal structure		cubic (O_h^5 – Fm3m)		
lattice parameters				
a	5.692 Å			71B
	5.691 Å			78M
energy gap				
E_g	≈0.4 eV	4f-cond. band	X-ray spectroscopy	82G
	3.2 eV	val.-cond. band	(K, $L_{2,3}$-emission, K-absorption)	
	0.98 eV		optical spectroscopy	71B
	1.1 eV			74N
	1.325(5) eV	4f → conduction band transition		80G
dE_g/dp	– 6.5 meV $kbar^{-1}$			74N
bulk modulus				
B_0	720(50) kbar			74J
phonon wavenumbers				
$(\nu/c)_{TO}$	199(3) cm^{-1}		IR measurements	78M
	203 (3) cm^{-1}	T = 77 K		
$(\nu/c)_{LO}$	272(3) cm^{-1}			
	276(3) cm^{-1}	T = 77 K		
dielectric constants				
$\varepsilon(0)$	9.5(5)			78M
	9.6(5)	T = 77 K		
$\varepsilon(\infty)$	5.0(5)			
	5.0 (5)	T = 77 K		
energy gap				
E	1.8 eV	$4f^{14}(1S_0)$ → $4f^{13}(^2F_{7/2})5d$ transition;		80G
	2.8 eV	$4f^{14}(1S_0)$ → $4f^{13}(^2F_{5/2})5d$ transition		
activation energy for conductivity				
E_A	0.3...0.4 eV	p-type		80G

Figures and further references:

optical absorption: Figs. 1, 2, pressure dependence of the absorption spectrum: Fig. 3

photocurrent and photo-emf: Fig. 4

Raman spectrum: Fig. 5

traps due to non-stoichiometry; bulk and surface states [82M]

References:

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Fig. 1.

Yb-chalcogenides. Absorption coefficient vs. wavelength (photon energy) for thin films on NaCl substrates at atmospheric pressure [74N].

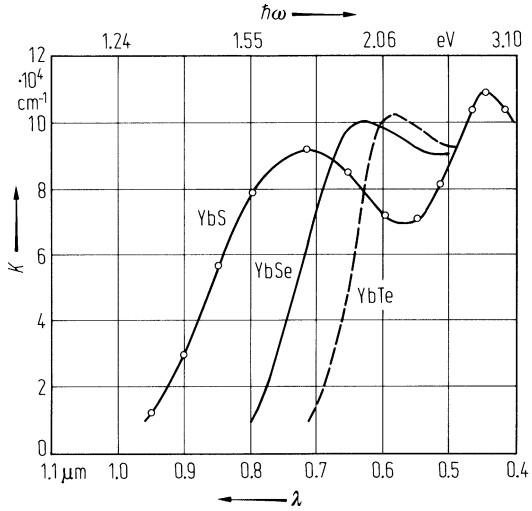

Fig. 2.

YbS. Absorption coefficient (*1*) and absorption coefficient times photon energy (*2*) vs. photon energy for a 0.3 μm thick film [80G].

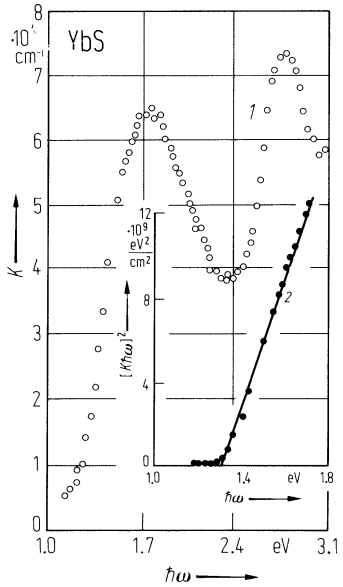

Fig. 3.

YbS. Absorption edge at atmospheric pressure and at 6 kbar vs. wavelength (photon energy) [74N].

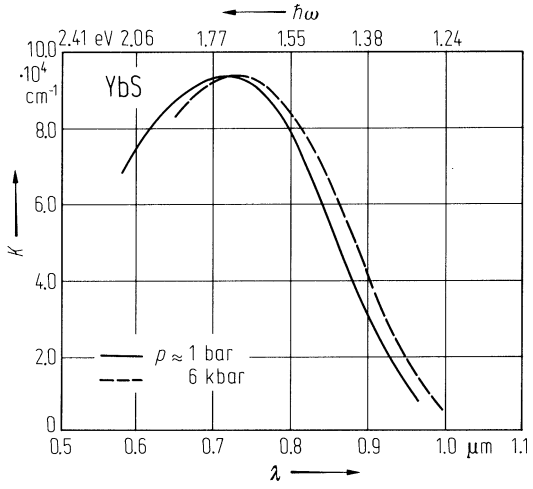

Fig. 4.

YbS. Photocurrent (*1*) and photo-emf (*2*) vs. photon energy of a 2.8 μm thick film [80G].

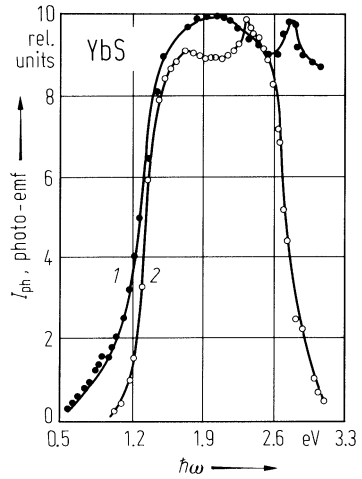

Fig. 5.

YbS. Raman spectra (intensity vs. Raman shift) for different exciting laser energies [78M].