substance: Ta_2O_5
property: refractive index, dielectric constants

refractive index

n	2.21	λ = 632.8 nm		74L
n^2	$A + B (\nu/c)^2$	visible range		79S
A	4.2446		evaporated film as grown	
B	0.13158 μm^2			
A	4.2454		baked evaporated film	
B	0.06677 μm^2			
n	$1.85 + 1671(\lambda–903)^{–1}$	λ = 275.0 1400 nm	anodic thin film	75A
	2.20(3)	λ = 546.1 nm		73K
	2.12...2.20 2.32...2.37		for the principal optical axes of β-Ta_2O_5 at 671.0 nm	56K
	2.22, 2.30, 2.325		for the principal optical axes of α-Ta_2O_5	56K

dielectric function

Results on β-form ceramic (Fig. 1) and α-form single crystal (Fig. 2) quite different, with the α-form showing strong anisotropy and dispersion at high temperatures. There is also a strong rise in ε above 300 K for the α-form, a result also reported for thin films [73K]. The observed dielectric relaxation has an activation energy of 0.64 eV, close to that observed for film growth on tantalum [58V] and for conductivity in ceramics at low temperatures and high oxygen pressures [62K]. Capacitance data on H–Ta_2O_5 – p-Si sandwiches also showed a dielectric relaxation process with an activation energy of 0.71 eV [74A].

References:

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Fig. 1.

Ta_2O_5. Dielectric constant and dissipation factor curves of β-Ta_2O_5 ceramics vs. temperature at frequencies of 100Hz (*1*), 1 kHz (*2*), 10 kHz (*3*), 100 kHz (*4*) [64P].

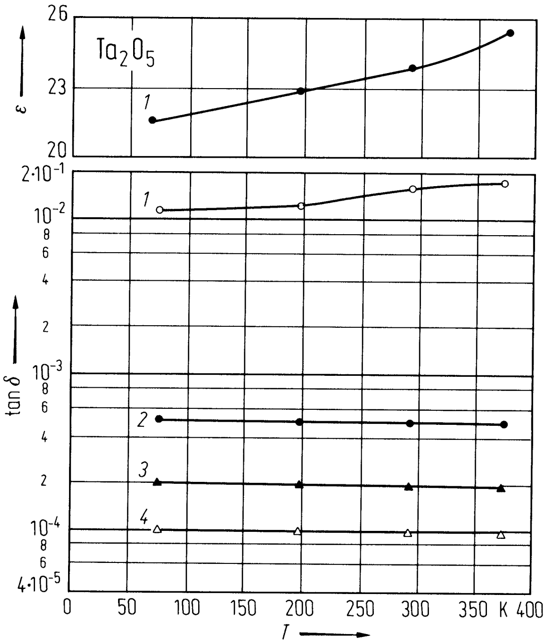

Fig. 2.

Ta_2O_5. Dielectric constant and dissipation factor for α-Ta_2O_5 in two mutually perpendicular orientations. Symbols as in Fig. 1 [64P].