substance: Ti_nO_{2n-1} ($n \geq 3$)
property: optical properties

Diffuse reflectance spectra of Ti_nO_{2n-1}: Fig. 1. A very broad peak that shifts steadily to the red with increasing n is apparent, and a linear relationship between log n and $(v/c)_{max}$ is found (Fig. 2). In the low-temperature phase of Ti_4O_7, there is an absorption onset at $\lambda \approx 5$ μm, suggesting a bandgap of 0.25 eV [77K]. Above the first transition, with rising temperature, at 143 K the transmission at 5.6 μm falls dramatically. The photoelectron spectrum of Ti_3O_5 shows a distinct d-band split into a doublet below T_{tr} (≈ 0.8 eV); this doublet merges above the transition temperature [78V].

References:

72P Porter, V. R., White, W. B., Roy, R.: J. Solid State Chem. 4 (1972) 250.
77K Kaplan, D., Schlenker, C., Since, J. J.: Philos. Mag. 36 (1977) 1275.
78V Vaandevan, S., Hedge, M. S., Rao, C. N. R.: Solid State Commun. 27 (1978) 131.

Fig. 1.

Ti_nO_{2n-1}. Absorbance vs. wavelength for several intermediate oxides at RT [72P]. Wavenumbers of the maxima are also given.

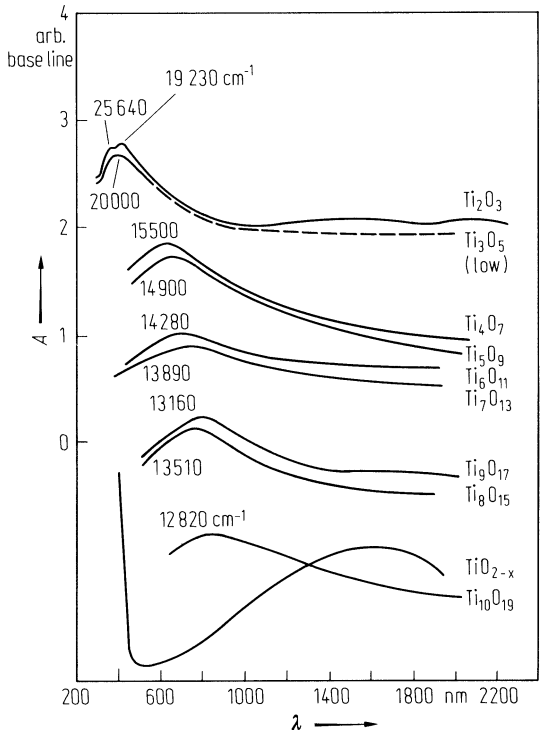

Fig. 2.

Ti_nO_{2n-1}. Parameter n vs. wavenumber of absorption maximum at RT in diffuse reflectance spectrum. *: 1.6 μm band in "reduced rutile" [72P].