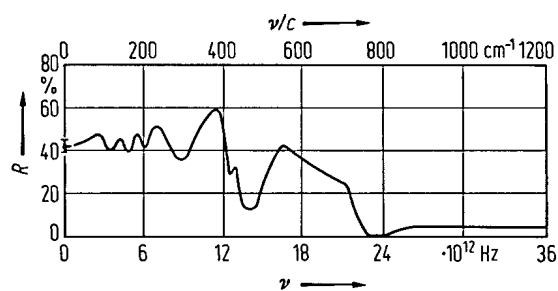


**No. 1A-12  $\text{CaZrO}_3$ , Calcium zirconate**  
( $M = 179.30$ )

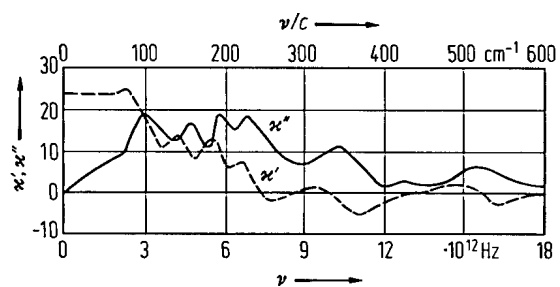
1a	Physical properties of $\text{CaZrO}_3$ were studied in comparison with other perovskite-type ferroelectrics.	55Cou
3a	Unit cell parameters: orthorhombic, $a = 5.587 \text{ \AA}$ , $b = 8.008 \text{ \AA}$ , $c = 5.758 \text{ \AA}$ at RT.	55Cou
4	Linear thermal expansion: $\alpha = 8.55 \cdot 10^{-6} \text{ }^\circ\text{C}^{-1}$ between $23 \text{ }^\circ\text{C}$ and $223 \text{ }^\circ\text{C}$ ; $\alpha = 9.53 \cdot 10^{-6} \text{ }^\circ\text{C}^{-1}$ between $223 \text{ }^\circ\text{C}$ and $333 \text{ }^\circ\text{C}$ for ceramics of bulk density $\rho = 4.95 \cdot 10^3 \text{ kg m}^{-3}$ .	65Bra
5a	Dielectric constant: $\kappa = 24.6$ at RT ( $f = 1 \text{ MHz}$ ).	61Ste
9a	Infrared absorption: Fig. 1A-12-001, Fig. 1A-12-002, Table 1A-12-001.	
16	Proton conductivity: see	92Hib

**Table 1A-12-001.**  $\text{CaZrO}_3$ . Frequencies in  $10^{12}$  Hz and symmetry of infrared modes of lattice vibration obtained from Kramers-Kronig analysis of the reflectance data at RT [65Per].

$\nu_1$ (Zr–O stretch)	$\nu_2$ (Zr–O <sub>3</sub> torsion)	$\nu_3$ (O–Zr–O bend)	$\nu_4$ (cation–ZrO <sub>3</sub> lattice mode)
15.4 (B <sub>1</sub> , B <sub>2</sub> , A <sub>1</sub> )	10.2 (B <sub>1</sub> , B <sub>2</sub> , A <sub>2</sub> ) (11.3) (12.5)	6.84 (B <sub>1</sub> , B <sub>2</sub> , A <sub>1</sub> ) 5.58	4.59 (B <sub>1</sub> , B <sub>2</sub> , A <sub>1</sub> ) 2.88



**Fig. 1A-12-001.**  $\text{CaZrO}_3$ .  $R$  vs.  $\nu$  [65Per].  $R$ : reflectance.



**Fig. 1A-12-002.**  $\text{CaZrO}_3$ .  $\kappa'$  and  $\kappa''$  vs.  $\nu$  [65Per]. The curves are obtained from the reflectivity data using Kramers-Kronig relation.

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