

PHYSICAL CHARACTERISTICS OF SELECTED OXIDES

The following data is compiled from published technical references. Most information is not derived from measurements made on OZARK TECHNICAL CERAMICS materials.

	<u>Al₂O₃</u>	<u>MgO</u>	<u>HfO₂</u>
<u>Basic Properties</u>			
Crystal Structure	<i>hexagonal</i>	<i>cubic</i>	<i>monoclinic*</i>
Melting Point (C)	2050	2825	2830
Theoretical Density (g/cc)	3.98	3.58	9.68
*tetragonal above 1650 C			
<u>Mechanical Properties</u>			
Hardness (Moh)	9	5.5	--
Microhardness (kg/mm ²)	2000	800	1100
Bend Strength, 25 C (psi)	80,000	35,000	--
Compressive Strength, 25 C (psi)	400,000	120,000	--
<u>Thermal Properties</u>			
Coefficient of Thermal Expansion (in/in- C x 10 ⁶)	7.9	13.9	5.8
Specific Heat, 70 F (Btu lb-1F-1)	.20	.22	.09
Thermal Conductivity (w/cm- C)			
20 C	.360	.480	.045
800 C	.071	.085	.026
<u>Electrical Properties</u>			
Electrical Conductivity (ohm ⁻¹ cm ⁻¹)			
25 C	10⁻¹²	10⁻¹²	10⁻¹⁰
400 C	10⁻¹⁰	10⁻¹⁰	10⁻⁸
800 C	10⁻⁷	10⁻⁷	10⁻⁶
1000 C	10^{-5.5}	10^{-5.5}	10^{-4.5}
1500 C	10^{-3.5}	10^{-3.5}	10⁻³
Dielectric strength (kV/ cm)	200	150	----
Dielectric constant	12.7	9.6	(18-45)

References:

- 1) Metals and Ceramics Information Center, "Engineering Property Data on Selected Ceramics, Volume III", July 1981
- 2) Bauer and Bates, "An Evaluation of Electrical Insulators for Fusion Reactors"
- 3) S.C. Meyers, "Selection and Conceptual design of High Temperature In-Fuel Thermocouples for the HEDL SLSF W-1 Test", April 1977

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