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Basic Material Properties

BASIC MATERIAL PROPERTIES

(may differ from coatings ... data is for pure materials/fully-dense)

PROPERTY	<u>Y₂O₃</u>	<u>ZrO₂</u>	<u>Al₂O₃</u>	<u>BN</u>	<u>TiN</u>
Formula Wt. (g)	225.8	123.2	102.0	24.8	61.9
Density (g/cc)	5.0	5.6	4.0	2.3	5.4
Crystal Structure	b.c.c.	Cubic/Monocl.	Hex.	Hex.	f.c.c.
Thermal Expansion (25-1000 C; 10 ⁻⁶ /C)	8.2	10.5	8.5	0.8-7.5 directional	8.7
Melting point (C)	2415	2600	2050	>2400 Sublimes	2950
Specific Heat (@293K, cal/g-K)	0.109	0.109	0.184	0.117	0.179
Thermal Conductivity (cal/cm-sec-K) @100 C	0.034	0.005	0.072	0.075 av.	0.069
@1400 C	0.007	0.006	0.013	0.050 av. directional	0.018 est.
Electrical Resistivity (@293K, ohm-cm)	10 ⁸	10 ⁷ -10 ⁸	10 ¹⁶	1.7 x 10 ¹³	22 x 10 ⁻⁶
Emissivity @1300 K	0.3	0.45	0.45	0.6	0.7
Chemical Resistance (molten metals/slugs)	Superior	Excellent	Good	Excellent	Good
Color	White	Cream	White	White	Golden Brown
Knoop Microhardness (kg/mm ² @ 100-g load)	700	1300	2100	200	1800
Dielectric Strength (volts/mil)	N.D.	230	400	800-1000	N.D.
Dielectric Constant	13-18	17-26	10	4	N.D.
Coefficient of Friction	N.D.	0.85	0.7	0.2 (to 350 C) 0.7 (at 600 C)	N.D.

Note: This data is for pure materials/fully-dense: properties of coatings may differ. This information is given for general purposes only.