

セラミックスの熱特性早見表

3,94 ⁽⁴⁾ g/cm ³	Aluminium Oxide	101,96 g/mol	5,01 g/cm ³	Yttrium Oxide	225,81 g/mol	5,7 - 6,6 ⁽⁵⁾ g/cm ³	Zirconium Dioxide	123,22 g/mol	4,24 g/cm ³	Titanium Dioxide	79,9 g/mol	3,58 g/cm ³	Magnesium Oxide	40,32 g/mol	3,37 g/cm ³	Calcium Oxide	56,08 g/mol	5,61 g/cm ³	Zinc Oxide	81,39 g/mol	10,97 g/cm ³	Uranium Dioxide	270,03 g/mol
0,77 J/(g·K)	Al₂O₃	2050 °C	0,45 J/(g·K)	Y₂O₃	2410 °C	0,45 J/(g·K)	ZrO₂	2680 °C	0,7 J/(g·K)	TiO₂	1855 °C	0,92 J/(g·K)	MgO	2852 °C	0,75 J/(g·K)	CaO	2575 °C	0,49 J/(g·K)	ZnO	1975 °C	0,24 J/(g·K)	UO₂	2840 - 2865 °C
220 - 350 ⁽⁴⁾ GPa	24 - 39 W/(m·K)	5,4 ·10 ⁻⁶ /K	200 - 205 ⁽⁵⁾ GPa	8 - 12 W/(m·K)	7,3 ·10 ⁻⁶ /K	190 - 210 ⁽⁴⁾ GPa	1,5 - 3 W/(m·K)	7 - 12 ⁽⁵⁾ ·10 ⁻⁶ /K	270 - 280 GPa	3 - 4 W/(m·K)	8 - 10 ⁽⁶⁾ ·10 ⁻⁶ /K	90 GPa	32 - 63 W/(m·K)	12 - 13 ·10 ⁻⁶ /K	-	-	11,2 ·10 ⁻⁶ /K	120 GPa	54 W/(m·K)	4,3 - 6,7 ⁽⁶⁾ ·10 ⁻⁶ /K	-	7 W/(m·K)	9,8 ·10 ⁻⁶ /K
3,68 g/cm ³	Aluminium Titanate	181,83 g/mol	5,85 g/cm ³	Barium Titanate	233,19 g/mol	6,04 g/cm ³	Lanthanum Zirconate	572,26 g/mol	3,20 g/cm ³	(Sinter-) Mullite	426,08 g/mol	2,19 - 2,66 g/cm ³	Silicon Dioxide	60,1 g/mol	2,55 - 2,57 g/cm ³	Cordierite	585 g/mol	2,6 - 2,8 g/cm ³	Steatite	379 g/mol	2,0 - 2,6 g/cm ³	Porcelain	-
0,75 J/(g·K)	Al₂O₃ + TiO₂	1894 °C	0,44 J/(g·K)	BaO + TiO₂	1620 °C	0,35 J/(g·K)	La₂Zr₂O₇	2300 - 2310 °C	0,75 J/(g·K)	3Al₂O₃ · 2SiO₂	1850 °C	0,75 J/(g·K)	SiO₂	1713 °C	0,75 J/(g·K)	Mg₂Al₄Si₅O₁₈	1470 °C	0,98 J/(g·K)	Mg₃Si₄O₁₀(OH)₂	800 ^(dec.) °C	0,75 - 0,90 J/(g·K)	-	
10 - 50 GPa	2,0 W/(m·K)	-5 - 20 ⁽⁶⁾ ·10 ⁻⁶ /K	67 GPa	5 - 6 ⁽⁵⁾ W/(m·K)	6,3 ·10 ⁻⁶ /K	175 GPa	2 W/(m·K)	9 ·10 ⁻⁶ /K	100 - 200 GPa	2 - 15 ⁽⁵⁾ W/(m·K)	4,5 - 5,6 ⁽⁶⁾ ·10 ⁻⁶ /K	30 - 80 GPa	1 - 11 ⁽⁵⁾ W/(m·K)	0,4 - 10,3 ⁽⁵⁾ ·10 ⁻⁶ /K	100 - 150 GPa	1 - 1,5 ⁽⁵⁾ W/(m·K)	0,5 - 2,0 ⁽⁵⁾ ·10 ⁻⁶ /K	60 - 110 GPa	3,3 W/(m·K)	6 - 9 ·10 ⁻⁶ /K	60 - 100 GPa	1 - 4 W/(m·K)	1 - 8 ·10 ⁻⁶ /K
3,21 g/cm ³	Silicon Carbide	40,1 g/mol	3,1 - 3,2 g/cm ³	Silicon Carbide	-	2,51 g/cm ³	Boron Carbide	55,25 g/mol	15,63 g/cm ³	Tungsten Carbide	195,86 g/mol	14,5 g/cm ³	Tantalum Carbide	192,96 g/mol	4,94 g/cm ³	Titanium Carbide	59,88 g/mol	2,22 g/cm ³	Calcium Carbide	64,1 g/mol	2,25 - 3,45 ⁽⁵⁾ g/cm ³	Boron Nitride	24,83 g/mol
0,66 J/(g·K)	SiC	2300 ^(dec.) °C	0,88 J/(g·K)	SiC-SiSiC	1410 ^(Si) °C	0,92 J/(g·K)	B₄C	2350 °C	0,18 J/(g·K)	WC	2870 °C	0,19 J/(g·K)	TaC	3800 °C	0,54 J/(g·K)	TiC	3100 °C	0,96 J/(g·K)	CaC₂	2160 °C	0,8 J/(g·K)	BN	2967 °C
150 - 450 GPa	100 - 350 ⁽⁴⁾ W/(m·K)	3,3 ·10 ⁻⁶ /K	170 - 420 GPa	100 - 120 ⁽⁴⁾ W/(m·K)	4,0 - 5,8 ·10 ⁻⁶ /K	390 - 440 GPa	30 - 45 W/(m·K)	4 - 6 ⁽⁶⁾ ·10 ⁻⁶ /K	450 - 650 GPa	40 - 80 ⁽⁵⁾ W/(m·K)	3,7 - 4,7 ⁽⁶⁾ ·10 ⁻⁶ /K	150 - 600 GPa	180 W/(m·K)	4,1 - 6,3 ⁽⁵⁾ ·10 ⁻⁶ /K	440 - 500 GPa	110 W/(m·K)	4,1 - 7,7 ⁽⁵⁾ ·10 ⁻⁶ /K	-	-	-	14 - 47 ^(4,5) GPa	10 - 35 W/(m·K)	1,8 ·10 ⁻⁶ /K
3,44 g/cm ³	Silicon Nitride	140,28 g/mol	5,22 g/cm ³	Titanium Nitride	61,91 g/mol	3,26 g/cm ³	Aluminium Nitride	40,99 g/mol	1,38 g/cm ³	Lithium Nitride	34,83 g/mol	2,57 g/cm ³	Magnesium Diboride	45,93 g/mol	4,52 g/cm ³	Titanium Diboride	69,49 g/mol	2,45 g/cm ³	Calcium Hexaboride	104,94 g/mol	6,09 g/cm ³	Zirconium Diboride	112,84 g/mol
0,7 J/(g·K)	Si₃N₄	1900 ^(subl.) °C	0,59 J/(g·K)	TiN	2950 °C	0,71 J/(g·K)	AlN	2200 °C	2,16 J/(g·K)	Li₃N	845 °C	1,05 J/(g·K)	MgB₂	800 °C	0,63 J/(g·K)	TiB₂	2970 °C	-	CaB₆	2235 °C	0,42 J/(g·K)	ZrB₂	3246 °C
80 - 330 ⁽⁵⁾ GPa	15 - 25 W/(m·K)	1,7 - 3,8 ·10 ⁻⁶ /K	251 GPa	22 - 29 W/(m·K)	4,1 - 9,35 ·10 ⁻⁶ /K	320 GPa	70 - 285 ⁽⁵⁾ W/(m·K)	2,5 - 5,7 ⁽⁶⁾ ·10 ⁻⁶ /K	-	-	-	-	10 - 70 W/(m·K)	8 ·10 ⁻⁶ /K	370 - 570 GPa	60 - 120 W/(m·K)	5,6 - 10 ⁽⁶⁾ ·10 ⁻⁶ /K	379 GPa	-	-	344 - 440 GPa	23 W/(m·K)	5,2 - 6,7 ⁽⁶⁾ ·10 ⁻⁶ /K

Leading Thermal Analysis ■

Comments

- (1) at room temperature
- (2) temperature determined at 10 K/min under nitrogen
- (3) dry conditions
- (4) depending on the purity
- (5) depending on the phase/structure/composition
- (6) depending on the direction
- (7) thermoanalytical technique

Oxides	Density ⁽¹⁾	Name	Molar Mass
Carbides	Specific Heat Capacity ⁽¹⁾	Ceramic type	Melting Temperature
Nitrides	(7) DSC, STA, LFA		(7) DSC, STA
Borides	Young-Modulus ⁽¹⁾	Thermal Conductivity ⁽¹⁾	Coefficient of linear Thermal Expansion ⁽¹⁾
	(7) DMA	(7) LFA, HFM, GHP	(7) DIL, TMA