۱. مشخصات مکانیکی چوب

Wood	Density[1] ($Mg\ m^{-3}$)	Young's modulus[1,2] (GPa)		Strength[1,3] (MPa) ∥ to grain		Fracture toughness[1] ($MPa\ m^{1/2}$)	
		∥ to grain	⊥ to grain	Tension	Compression	∥ to grain	⊥ to grain
Balsa	0.1–0.3	4	0.2	23	12	0.05	1.2
Mahogany	0.53	13.5	0.8	90	46	0.25	6.3
Douglas fir	0.55	16.4	1.1	70	42	0.34	6.2
Scots pine	0.55	16.3	0.8	89	47	0.35	6.1
Birch	0.62	16.3	0.9	–	–	0.56	–
Ash	0.67	15.8	1.1	116	53	0.61	9.0
Oak	0.69	16.6	1.0	97	52	0.51	4.0
Beech	0.75	16.7	1.5	–	–	0.95	8.9

۲. مشخصات مکانیکی فیبرها

Material	Density ρ ($Mg\ m^{-3}$)	Modulus E(GPa)	Strength σ_f (MPa)
Fibres			
Carbon, Type1	1.95	390	2200
Carbon, Type2	1.75	250	2700
Cellulose fibres	1.61	60	1200
Glass (E-glass)	2.56	76	1400–2500
Kevlar	1.45	125	2760
Matrices			
Epoxies	1.2–1.4	2.1–5.5	40–85
Polyesters	1.1–1.4	1.3–4.5	45–85

۳. مشخصات مکانیکی کامپوزیتها

Material	Density ρ ($Mg\ m^{-3}$)	Young's modulus E(GPa)	Strength σ_y(MPa)	Fracture toughness K_{IC}($MPa\ m^{1/2}$)	E/ρ	$E^{1/2}/\rho$	$E^{1/3}/\rho$	σ_y/ρ
Composites								
CFRP, 58% uniaxial C in epoxy	1.5	189	1050	32–45	126	9	3.8	700
GFRP, 50% uniaxial glass in polyester	2.0	48	1240	42–60	24	3.5	1.8	620
Kevlar-epoxy (KFRP), 60% uniaxial Kevlar in epoxy	1.4	76	1240	–	54	6.2	3.0	886
Metals								
High-strength steel	7.8	207	1000	100	27	1.8	0.76	128
Aluminium alloy	2.8	71	500	28	25	3.0	1.5	179

۴. مشخصات مکانیکی پلیمری

Polymer	Cost (UK£ ($US) tonne^{-1})	Density (Mg m^{-3})	Young's modulus (20°C 100 s) (GPa)	Tensile strength (MPa)
Thermoplastics				
Polyethylene, PE (low density)	560 (780)	0.91–0.94	0.15–0.24	7–17
Polyethylene, PE (high density)	510 (700)	0.95–0.98	0.55–1.0	20–37
Polypropylene, PP	675 (950)	0.91	1.2–1.7	50–70
Polytetrafluoroethylene, PTFE	–	2.2	0.35	17–28
Polystyrene, PS	650 (910)	1.1	3.0–3.3	35–68
Polyvinyl chloride, PVC (unplasticised)	425 (595)	1.4	2.4–3.0	40–60
Polymethylmethacrylate, PMMA	1070 (1550)	1.2	3.3	80–90
Nylons	2350 (3300)	1.15	2–3.5	60–110
Resins or thermosets				
Epoxies	1150 (1600)	1.2–1.4	2.1–5.5	40–85
Polyesters	930 (1300)	1.1–1.4	1.3–4.5	45–85
Phenolformaldehyde	750 (1050)	1.27	8	35–55
Elastomers (rubbers)				
Polyisoprene	610 (850)	0.91	0.002–0.1	≈10
Polybutadiene	610 (850)	1.5	0.004–0.1	
Polychloroprene	1460 (2050)	0.94	≈0.01	
Natural polymers				
Cellulose fibres		1.5	25–40	≈1000
Lignin		1.4	2.0	–
Protein		1.2–1.4	–	–

Polymer	Fracture toughness (20°C) (MPa m$^{1/2}$)	Glass temperature T_g (K)	Softening expansion temperature T_s (K)	Specific heat (J kg^{-1} K^{-1})	Thermal conductivity (W m^{-1} K^{-1})	Thermal coefficient (MK^{-1})
Thermoplastics						
Polyethylene, PE (low density)	1–2	270	355	2250	0.35	160–190
Polyethylene, PE (high density)	2–5	300	390	2100	0.52	150–300
Polypropylene, PP	3.5	253	310	1900	0.2	100–300
Polytetrafluoroethylene, PTFE	–	–	395	1050	0.25	70–100
Polystyrene, PS	2	370	370	1350–1500	0.1–0.15	70–100
Polyvinyl chloride, PVC (unplasticised)	2.4	350	370	–	0.15	50–70
Polymethylmethacrylate, PMMA	1.6	378	400	1500	0.2	54–72
Nylons	3–5	340	350–420	1900	0.2–0.25	80–95
Resins or thermosets						
Epoxies	0.6–1.0	380	400–440	1700–2000	0.2–0.5	55–90
Polyesters	0.5	340	420–440	1200–2400	0.2–0.24	50–100
Phenolformaldehyde	–	–	370–550	1500–1700	0.12–0.24	26–60
Elastomers (rubbers)						
Polyisoprene	–	220	≈350	≈2500	≈0.15	≈600
Polybutadiene	–	171	≈350	≈2500	≈0.15	≈600
Polychloroprene	–	200	≈350	≈2500	≈0.15	≈600
Natural polymers						
Cellulose fibres	–	–	–	–	–	–
Lignin	–	–	–	–	–	–
Protein	–	–	–	–	–	–

۵. مشخصات مکانیکی سرامیکها و شیشه‌ها

Ceramic	Cost (UK£ (US$) tonne^{-1})	Density (Mg m^{-3})	Young's modulus (GPa)	Compressive strength (MPa)	Modulus of rupture (MPa)	Weibull exponent m
Glasses						
Soda glass	700 (1000)	2.48	74	1000	50	Assume 10 in design
Borosilicate glass	1000 (1400)	2.23	65	1200	55	
Pottery, etc.						
Porcelain	260–1000 (360–1400)	2.3–2.5	70	350	45	
High-performance engineering ceramics						
Diamond	4×10^8 (6×10^8)	3.52	1050	5000	–	
Dense alumina	Expensive at	3.9	380	3000	300–400	10
Silicon carbide	present.	3.2	410	2000	200–500	10
Silicon nitride	Potentially	3.2	310	1200	300–850	–
Zirconia	350–1000	5.6	200	2000	200–500	10–21
Sialons	(490–1400)	3.2	300	2000	500–830	15
Cement, etc.						
Cement	52 (73)	2.4–2.5	20–30	50	7	12
Concrete	26 (36)	2.4	30–50	50	7	12
Rocks and ice						
Limestone	Cost of mining	2.7	63	30–80	20	–
Granite	and transport	2.6	60–80	65–150	23	–
Ice		0.92	9.1	6	1.7	–

Ceramic	Time exponent n	Fracture toughness (MPa m$^{1/2}$)	Melting (softening) temperature (K)	Specific heat (J kg^{-1} K^{-1})	Thermal conductivity (W m^{-1} K^{-1})	Thermal expansion coefficient (MK^{-1})	Thermal shock resistance (K)
Glasses							
Soda glass	10	0.7	(1000)	990	1	8.5	84
Borosilicate glass	10	0.8	(1100)	800	1	4.0	280
Pottery, etc.							
Porcelain	–	1.0	(1400)	800	1	3	220
High-performance engineering ceramics							
Diamond	–	–	–	510	70	1.2	1000
Dense alumina	10	3–5	2323 (1470)	795	25.6	8.5	150
Silicon carbide	40	–	3110 –	1422	84	4.3	300
Silicon nitride	40	4	2173 –	627	17	3.2	500
Zirconia	10	4–12	2843 –	670	1.5	8	500
Sialons	10	5	– –	710	20–25	3.2	510
Cement, etc.							
Cement	40	0.2	–	–	1.8	10–14	<50
Concrete	40	0.2	–	–	2	10–14	
Rocks and ice							
Limestone	–	0.9	–	–	–	8	≈100
Granite	–	–	–	–	–	8	
Ice	–	0.12	273 (250)	–	–	–	

۶. مرجع

Engineering Materials 2, An Introduction to Microstructures, Processing and Design, Second Edition, Michael F. Ashby, David R. H. Jones, Butterworth-Heinemann, 1998.