

Silicon data

Data in the literature varies widely, but thermal conductivity is probably ~100->150 W/m-K @140K

2.33 g/cc

E = 107 GPa, 150 GPa (two sources)

Poisson's ratio = 0.17

fracture strength = .83 to .95 MPa

thermal capacity (from Debye & plot) = .44 J/g-K @ 140K

Debye temp 640K

molecular wt 28.09

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Molybdenum data

D.Pankow's books:

these data should be good to 5%.

For moly at -190F (150K):

conductivity is 84 (BTU/hr)/(ft*degrF) which I make to be 145 W/K/m

Thermal capacity is .047 BTU/lb/F which I make to be .20 J/g/K

emissivity = .024 (Is that believable? I know it was polished, but...)

	90K	300K	
tensile	108,500	76,100	psi
elong	0.2	20.0	per cent

No moduli, unfortunately; probably not over 50% greater than at STP.

E = 47E6 psi * 6895 = 324 GPa

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Dexter-Hysol EA9361 data

integral of CTE from 300 down to 140 is ~.0096 m/m .

Thermal capacity @150K is .78 J/g-K and @140K is .63 J/g-K

Lap shear @150K from moly to silicon is 2000 to 4000 psi depending on goodness of the particular bond.

Shear strength is 4000 psi (27.6 MPa). Torsion test.

Shear modulus is 265 ksi (1.83 GPa). Torsion test.

Thermal conductivity @150K is .238 W/m-K

[Compare to 2850FT, with $k = 1.41\text{W/m-K}$ @150K]

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