

Thermal Contact Resistance of Nanoscale Rough Surfaces

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Abstract : In nanostructured material thermal transport is dominated by contact resistance. Theoretical models describing thermal transport at interfaces assume perfectly flat surface whereas in reality surfaces can be rough with roughness ranging from sub-nanoscale dimension to micron scale. Here we introduce a model which includes both nanoscale contact mechanics and nanoscale heat transfer for rough nanoscale surfaces. This comprehensive model accounts for the effect of phonon acoustic mismatch, mechanical properties, chemical properties and randomness of the rough surface.

Keywords : adhesion and contact resistance, Kapitza resistance of rough surfaces, nanoscale thermal transport

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