**PHONON TRANSPORT IN NANOPOROUS SOLIDS**

Non-metallic solids show a wide range of thermal conductivities at room temperature. In such covalently bonded structures, heat transfer is realized through the transport of phonons, quanta of energy exchanged between atoms due to their vibrations. We are investigating the mechanisms of phonon transport using molecular simulations, with a goal of designing new materials with low conductivity and high strength. Structures built from the SiO$_4$ tetrahedra are being considered. Among these are the zeolites, porous crystals that are used industrially as molecular sieves, catalysts and dessicants. The presence of Angstrom sized pores in zeolites leads to multiple length scales (including the secondary building units - SBUs) in the transport problem and unique possibilities for phonon localization and low conductivity. The analysis methods involve detailed investigations of the lattice statics and dynamics using calculated structural properties, vibrational spectra, and time correlation functions.

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