**Odd-even phonon transport effects in strained carbon atomic chains bridging graphene nanoribbon electrodes**

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Based on first-principles approaches, we study the ballistic phonon transport characteristics of finite monatomic carbon chains stretched between graphene nanoribbons, an sp1-sp2 hybrid carbon nanostructure that has recently seen significant experimental advances in its synthesis. We find that the lattice thermal conductance anomalously increases with tensile strain for the even-numbered carbon chains that adopt the alternating bond-length polyyne configuration. On the other hand, in the odd-numbered carbon chain cases, which assume the equal bondlength cumulene configuration, phonon conductance decreases with increasing strain. We show that the strong odd-even phonon transport effects originate from the characteristic longitudinal acoustic phonon modes of carbon wires and their unique strain-induced redshifts with respect to graphene nanoribbon phonon modes. The novel phonon transport properties and their atomistic mechanisms revealed in this work will provide valuable guidelines in designing hybrid carbon nanostructures for next-generation device applications such as nanobiosensors.