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Title:Temperature dependence of ultrafast phonon dynamics in graphite
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Abstract:Nonequilibrium optical phonons are generated in graphite following the excitation of electron-hole pairs with a femtosecond laser pulse. Their energy relaxation is probed by means of terahertz pulses. We find that the hot-phonon lifetime increases by a factor of 2 when the sample temperature decreases from 300 to 5 K. These results suggest that the energy relaxation in graphite at room temperature and above is dominated by the anharmonic decay of hot A 1 ′ phonons at the K point into acoustic phonons with energies of about 10 meV.
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