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A Study of the Cross–Over Temperature between the Adiabatic and Non–Adiabatic Contributions to the Electron–Phonon Free Energy in Na, K, Al, and Pb NICOLAS BOCK, Los Alamos National Laboratory, DERMOT COFFEY, Buffalo State College, Buffalo, NY, DUANE WALLACE, Los Alamos National Laboratory — We calculate the electron–phonon contribution to the free energy and entropy for four elemental metals, Na, K, Al, and Pb, using realistic phonon spectra and pseudopotentials for temperatures between $0 \leq T < 1.5\ T_{melt}$. We show that the non–adiabatic contribution dominates at low temperatures whereas the adiabatic contribution dominates at high temperatures. We calculate the cross–over temperatures between the two contributions which is roughly between 0.5 and 0.8 T_{melt}. Where we are able to compare, we find good agreement with experiment.

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