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The Origin and Manifestations of Enhanced Surface Electron-Phonon Coupling

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Translational symmetry is broken at a surface creating a unique environment for enhanced electron-phonon coupling. Atoms at or near the surface would prefer a geometrical arrangement that is different for the bulk, whereas the underlying substrate would prefer these atoms maintain the bulk configuration. This competition results in a very rich set of phenomena, which in most cases is associated with electron-phonon coupling. This talk will first review what is known about electron-phonon coupling at the surface as seen in the temperature dependence and distortion near the Fermi energy of 2D surface state bands. New data for two different surface states on Be(1010) will be used as a specific example. Finally, the manifestations of enhanced surface electron-phonon coupling will be discussed, starting with the temperature dependence of the binding energy of surface states with and without an enhanced electron-phonon coupling and then moving to 2D phase transition and the anomalous thermal contraction seen on many metal surfaces.

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