

PC4-5

Infrared Spectroscopic Studies of the Phonon Dynamics in Iron-based Superconductors

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The temperature dependence optical reflectivity has been measurement on iron-based superconductors of different families. The optical conductivity has been obtained by using the two-Drude component model. It has been found that the phonons show red- or blue-shift in different samples. Interestingly, the phonon conductivity exhibits a Fano lineshape, suggesting possible coupling between phonon and electrons or spin. Based on the temperature evolution of the lineshape and peak shift, we discuss the possible role played by electron-phonon and spin fluctuation in the occurrence of superconductivity in iron-based superconductors.

Keywords: Infrared spectroscopy, iron-based superconductor, electron-phonon coupling