Interpretation of optical conductivity in normal state of Iron-Based Superconductors CeOFeAs

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Quantitative analysis of the optical conductivity (σ) for the normal state of Iron-Based superconductors CeOFeAs have been made within the two-component scheme: one is the coherent Drude free carrier excitations and other is incoherent motion of carriers leading to a polaron formation, originated from inter and intra layer transitions of charge carriers. The model successfully accounts for the anomalies reported in the optical measurements for metallic state of the superconductors. The frequency dependent relaxation rates are expressed in terms of memory functions and the coherent Drude carriers from the effective interaction potential leads to a sharp peak at zero frequency which is an indication of metallic conduction and a long tail at higher frequencies, i.e. in the infrared region. While to that the hopping of carriers from Fe to Fe in the FeAs layer and from FeAs layer to CeO layer (incoherent motion of carriers) yields two-peak value around 100 cm^{-1} and 425 cm^{-1} respectively in the optical conductivity centred at mid-infrared region. Both the Drude and hopping carriers contribute to the optical process of conduction in the iron-based superconductors and shows similar results on optical conductivity in the mid-infrared as well as infrared frequency regions as those revealed from experiments.