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Title: Two-Band BCS Mechanism of Superconductivity in a Ba(Fe(0.9)Co(0.1))(2)As(2) High-Temperature Superconductor
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Abstract: Terahertz and infrared spectra of the conductivity, sigma(nu), and dielectric constant, epsilon(nu), of a Ba(Fe(0.9)Co(0.1))(2)As(2) film (T(c) = 20 K) have been analyzed together with previous specific-heat and angular resolved photoelectron spectroscopy data. It has been shown that the spectra sigma(nu) and epsilon(nu) of Ba(Fe(0.9)Co(0.1))(2)As(2) in the superconducting phase at T = 5 K, as well as the magnetic field penetration depth, can be described well using the standard Bardeen-Cooper-Schrieffer (BCS) model with an additive contribution of electron and hole bands. It has been found that the measured temperature dependence of the magnetic field penetration depth in a wide temperature range 5 K < T < T(c) can be described only with the introduction of interband pairing interaction. The coupling constant of electron and hole bands, lambda(1, 2) = 0.1, as well as the temperature dependences of superconducting gaps in the electron and hole subsystems, has been determined using the model of two-band superconductivity developed earlier for MgB(2).