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Optical Properties of Organic Superconductor κ-$(BETS)_2FeBr_4$[1]

M. REEDYK, N. HOSSEIN KHAH, B. LIU, G.V. SUDHAKAR RAO, Brock University, St. Catharines, Canada, H. FUJIWARA, Osaka City University, Japan, H. KOBAYASHI, M.A. TANATAR[2], K. YAKUSHI, T. NAKAMURA, Institute for Molecular Science, Okazaki, Japan — The optical response to far- and mid-infrared radiation has been measured for quasi two-dimensional plate-shaped crystals of κ-$(BETS)_2FeBr_4$ [where BETS = bis(ethylenedithio)-tetraselenafulvalene]. κ-$(BETS)_2FeBr_4$ is the first antiferromagnetic organic superconductor at ambient pressure with Néel temperature $T_N = 2.5$ K and superconducting transition temperature $T_C = 1.1$ K. Polarized thermal reflectance measurements were performed to compare the reflectance above and below T_C and T_N using a Martin-Puplett-type polarizing interferometer and ^{3}He cryostat. In addition polarized absolute reflectance measurements in the far- and mid-infrared were carried out at temperatures in the normal state between 4 K and 300 K using a Michelson interferometer and cold finger cryostat. Kramers-Kronig analysis was then used to determine the optical conductivity of κ-$(BETS)_2FeBr_4$ at these temperatures.

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