Charge-transfer processes in radical ion molecular conductors κ-(BEDT-TTF)2Cu[N(CN)2]Br x Cl1 − x : The superconductor (x = 0.9) and the conductor with the metal-insulator transition (x = 0)

Titre	Charge-transfer processes in radical ion molecular conductors κ-(BEDT-TTF)2Cu[N(CN)2]Br x Cl1 − x : The superconductor (x = 0.9) and the conductor with the metal-insulator transition (x = 0)
Type de publication	Article de revue
Auteur	Vlasova, R. [1], Drichko, Natalia [2], Petrov, B. [3], Semkin, V. [4], Faltermeier, Daniel [5], Braz, José [6], Dumm, Michael [7], Dressel, Martin [8], Mézière, Cécile [9], Batail, Patrick [10]
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Résumé en anglais	Optical spectral investigations of low-dimensional organic molecular conductors κ-(BEDT-TTF)2Cu[N(CN)2]Br x Cl1 − x with x = 0.9 (the superconductor with T c = 11.3 K) and x = 0 (the metal with the metal-insulator transition at T < 50 K) are performed in the range 50–6000 cm−1 (6 meV–0.74 eV) at temperatures from 300 to 20 K. The optical conductivity spectra are quantitatively analyzed in terms of the proposed model, according to which the charge transfer involves two types of charge carriers, i.e., electrons (holes) localized on clusters (dimers and tetramers formed by BEDT-TTF molecules) and quasi-free charge carriers, with the use of the tetramer “cluster“ model based on the Hubbard Hamiltonian for correlated electrons and the Drude model for quasi-free charge carriers. Physical parameters of the model, such as the energy of Coulomb repulsion between two electrons (holes) in one molecule, the transfer integrals between molecules inside the dimer and between dimers, and the electron-molecular vibration coupling constants, are determined. The anisotropy of the spectra in the conducting plane is explained. The inference is made that only electrons localized on clusters couple with intramolecular vibrations.
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