Electronic state of metal-insulator transition in $\lambda$-BETS$_2$FeCl$_4$ under magnetic field

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A magnetic organic conductor $\lambda$-BETS$_2$FeCl$_4$ (BETS = bis (ethylenendithio) tetraselenafulvalene) exhibits the metal-insulator (M-I) transition combining with the magnetic ordering [1]. Schottky-type of specific heat in weak magnetic field of antiferromagnetic insulator (AFI) phase and a large linear specific heat in magnetic field induced metal (M) phase were observed. We studied the transport properties of $\pi$ conduction electron varying the magnetic field. A figure shows that the temperature dependence of the resistivity. As increasing the magnetic field, M-I transition temperature ($T_{MI}$) and increasing resistivity derived from M-I transition do not show the noticeable changes up to 3 T. Above 3 T, $T_{MI}$ starts to go down, nevertheless the clearly changes in increase of resistivity can’t be observed. We discuss the mechanism of the M-I transition comparing this transports properties of $\pi$ electron with the Schottky-type specific heat caused by 3d spin.


Temperature dependence of the resistivity of $\lambda$-BETS$_2$FeCl$_4$ as a function of magnetic field.