

Diamagnetic transition of κ -(BEDT-TTF)₄Hg_{2.89}Cl₈ probed by ac susceptibility measurements under pressures

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κ -(BEDT-TTF)₄Hg_{2.89}Cl₈ is regarded as a doped metal. This is because this material has incommensurate superlattice of Hg ions and the band filling is slightly shifted from the half filled state which is typical in usual κ -type salts. Furthermore κ -(BEDT-TTF)₄Hg_{2.89}Cl₈ was known to become superconducting under pressure, and the characteristic pressure dependence of T_c was reported by the resistivity measurement [1]. But there has been no report about diamagnetic transition.

Figure 1 displays temperature dependence of ac susceptibility (real part) for various pressures. While no indication of superconductivity appeared at 0.32 GPa, the apparent diamagnetic transitions were observed at 0.41-0.84 GPa. On the other hand the diamagnetic signal was not observed at pressures higher than 1 GPa although the existence of higher-pressure superconducting phase at 2-2.6 GPa was reported. From these results, we constructed the phase diagram in Fig.2. The dome-type superconducting phase appears in the diagram. This structure and insensitiveness of superconducting phase are characteristic features different from those of usual κ -type salts, which may come from the doping nature of the electric state.

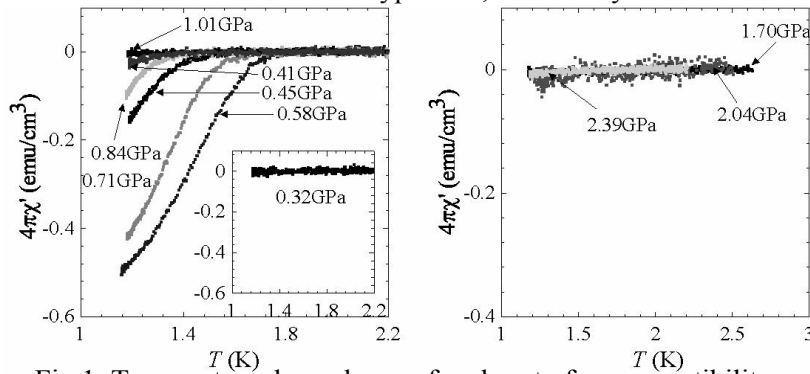


Fig.1. Temperature dependence of real part of ac susceptibility in κ -(BEDT-TTF)₄Hg_{2.89}Cl₈ for various pressures.

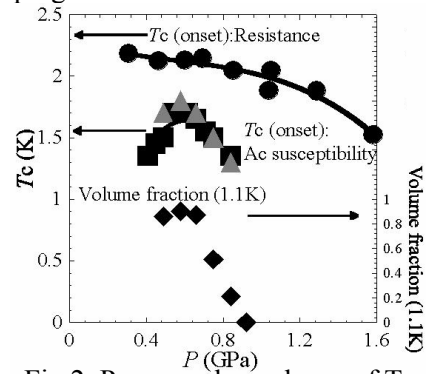


Fig.2. Pressure dependence of T_c of κ -(BEDT-TTF)₄Hg_{2.89}Cl₈.

[1] H. Taniguchi *et al.*, J. Phys. Soc. Jpn. Supple. A, **76**, (2007) 168.