

## Charge Fluctuation of the Superconducting Molecular Crystals

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Organic superconductor has been attracted attention from the viewpoint of the magnetic fluctuation. On the contrary, very little work is currently available on the charge fluctuation, except for the theoretical prediction [1]. In this symposium, we present the fluctuation of the site-charges for the insulating, bad-metallic, superconducting and metallic materials belonging to the 3/4-filled and 2/3-filled  $\beta''$ -type ET salts [2]. The conducting properties are mapped with the difference in the site-charges between the charge-rich site and charge-poor site,  $\Delta\rho$ . The superconducting materials have the small but finite  $\Delta\rho$ , whereas  $\Delta\rho$  of the insulating (metallic) materials is large (almost zero). Interestingly,  $\Delta\rho$  is also correlated with the alternation in the inter-molecular distances rather than the inter-molecular distance itself. This relation indicates that the alternation in the inter-site Coulomb repulsion,  $V$ , rather than the magnitude of  $V$ , plays an important role in the distributions of the site-charges. Therefore,  $\Delta\rho$  as well as the conducting behavior depends on the number of the distributions allowed in the repeat unit. Our analysis is consistent with the fact that superconducting materials in the  $\beta''$ -type ET salts have a large repeat unit.

[1] J. Merino and R. H. McKenzie, Phys. Rev. Lett. **87** (2001) 237002.

[2] T. Yamamoto et al., Phys. Rev. B. **77** (2008) 205120.