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Determination of ground state in potassium intercalated polyacenes QUYNH PHAN, SATOSHI HEGURI, YOICHI TANABE, HIDEKAZU SHIMOTANI, KATSUMI TANIGAKI, Department of Physics, Graduate School of Science, Tohoku University, 6-3 Aoba, Aramaki, Aoba-ku, Sendai, Japan, TAKEHITO NAKANO, YASUO NOZUE, Department of Physics, Graduate School of Science, Osaka University, 1-1 Machikaneyama, Toyonaka, Osaka, Japan — Intercalated compounds of polycyclic aromatic hydrocarbons have been drawing much attention from the view point of new type of organic superconductors. The mechanism of superconductivity in these materials is still unclear, and therefore the true ground states with various carrier concentrations must be understood. The antiferromagnetic ground states were reported particularly on K-doped pentacene, a typical polyacene. In the present study, we focus on the synthesis and the magnetic properties of K-intercalated polyacenes, such as anthracene, tetracene, and pentacene. The improved synthetic method based on the conventional solid state reaction was employed to obtain high quality bulk samples. The X-ray powder diffraction profiles of doped samples showed new stable phases. Interestingly, a pronounced hump at 150 K was observed in the temperature dependence of magnetic susceptibility of K_1anthracene. In ESR measurements the linewidth of the signals decreased significantly with a decrease in temperature below 150 K and no Pauli magnetic contribution was detected. These results clearly indicate that charge transfer occurs but the most stable ground state is still insulating via antiferromagnetic interactions. Further discussion will be made among these K-intercalated polyacenes.

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