Structures and physical propertis of new types of organic superconductors, $A_x$picene, $A_x$coronene and $A_x$phenanthrene

Y. Kubozono[a] and T. Kambe[b]

[a]Research Laboratory for Surface Science, Okayama University, Okayama 700–8530, Japan
[b]Department of Physics, Okayama University, Okayama 700–8530, Japan

New types of organic superconductors are produced by intercalating alkali or alkali earth metal atoms into the solids of three different hydrocarbons, picene, coronene and phnenanthrene. The superconducting transition temperatures, T_cs, are 5 – 18 K for these compounds [1] . The K_3picene has two different superconducting phases of T_c = 7 and 18 K, while Rb_3picene has one superconducting phase with T_c of 7 K. It has been suggested from the lattice constants that the K and Rb atoms are intercalated into the herringbone stacking layer of picene molecules (intralayer). Very recently, more precise structural determination has been achieved for $K_x$picene [2]. The lower and upper critical fields for K_3picene and Rb_3picene gave physical parameters such as Ginzburg–Landau coherence length and magnetic penetration depth. The K_3picene (T_c = 7 K) showed the moderate negative pressure effect by applying pressure up to 10 kbar, in contrast to the positive pressure effect for K_3phenanthrene [3]. In this talk we will fully show the structures and physical properties of $K_x$picene, Rb_xpicene, $K_x$coronene and $K_x$phenanthrene.

[1]R. Mitsuhashi et al. Nature **464**, 76 (2010).
[2]H. Sawa et al. private communication.
[3]X. F. Chen et al. arXiv:1102.4075v1 in cond-mat.

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