

Top-down and Bottom-up Nanoscience of Molecular Conductors

Hiroshi M. Yamamoto,¹ Yosuke Kosaka,^{1,2} Yoshitaka Kawasaki,^{1,3} Mutsumi Ikeda,^{1,3} Akiko Nakao,⁴ Reizo Kato^{1,2,3}

1- RIKEN, JST-CREST, Hirosawa, Wako-shi Saitama, 351-0198 JAPAN; yhiroshi@riken.jp

2- Department of Chemistry, Faculty of Science, Saitama University, Saitama, Saitama 338-8570 JAPAN

3- Department of Physics, Toho University, Funabashi, Chiba 274-8510 JAPAN

4- High-Energy Accelerator Research Organization, Tsukuba, Ibaraki 305-0801 JAPAN

Top-down and bottom-up approaches are two different ways of fabricating nano-scale structure, both of which we are utilizing in order to investigate nanoscience of molecular conductors. As top-down technique, single crystals of molecular conductors are directly grown at the electrodes on SiO₂/Si substrates. [1] The micro/nano crystals on the substrates show different properties from the corresponding bulk crystal. ReRAM (resistive random access memory) behaviour and field effect are also observed.

As bottom-up technique, supramolecular assembly based on halogen bond is employed to make insulating sheath covering conductive nanowires based on TTF derivatives. [2] Recent and future development of this kind of nanowires will be discussed.

[1] H. M. Yamamoto et al. *J. Amer. Chem. Soc.* **2006**, *128*, 700

[2] H. M. Yamamoto et al. *Synth. Metals*, **1999**, *102*, 1448

