

# n-Type Organic Thin Film Transistor Prepared by Solution Process

The PRI-AIST has succeeded in synthesizing a new fullerene derivative, C60-fused pyrrolidine-meta-C12 phenyl (C60MC12), by incorporating alkyl chain to fullerene (C60). C60MC12 is soluble in organic solvent, and found to constitute a good quality crystalline thin film by simple spin coating where fullerene heads self-aggregate to form layered structure.

An organic TFT has been prepared by using newly synthesized fullerene derivative C60MC12 for organic semiconductor layer, and characterized. The electron mobility is as high as  $0.067 \text{ cm}^2/\text{Vs}$ , which is the highest value for n-type organic semiconductor prepared through coating process (figure).

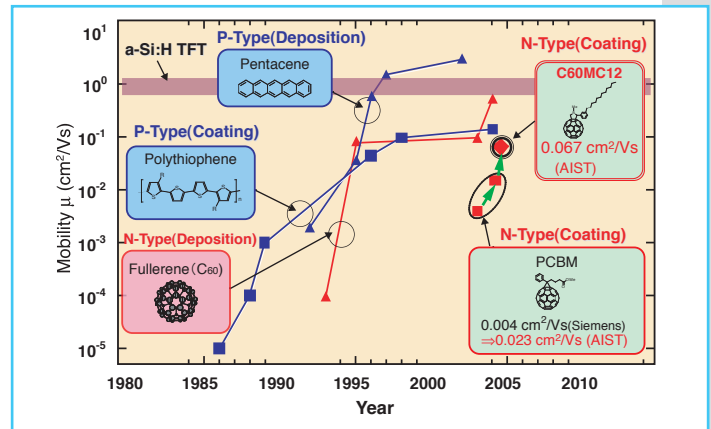


Fig. Mobility of holes and electrons in p-type and n-type organic semiconductors, respectively.

**Masayuki Chikamatsu**  
Photonics Research Institute  
E-mail: m-chikamatsu@aist.  
go.jp  
AIST Today  
Vol.5 , No.12 (2005) 21

Nanotechnology , Materials & Manufacturing

# Nano-Sized Calcium Phosphate Crystals Obtained by Bio-Inspired Methods

Living matters produce various materials in their bodies without consuming thermal energy. The natural bodies can be considered as material manufacturing plants with high-efficiency. In the biological synthesis of inorganic solids, an organism creates a proper organic matrix, and the crystals precipitate onto the matrix due to chemical interactions of an inorganic/organic hetero-interface. We attempted to apply this mechanism in material synthesis to produce nano-sized calcium phosphate crystals. Phase separated microenvironments of organic molecules were employed as microreactors for the nano crystals formation. Organic functional group bounded water mediated calcium phosphate crystal nucleation, and the nano-sized crystals were obtained.

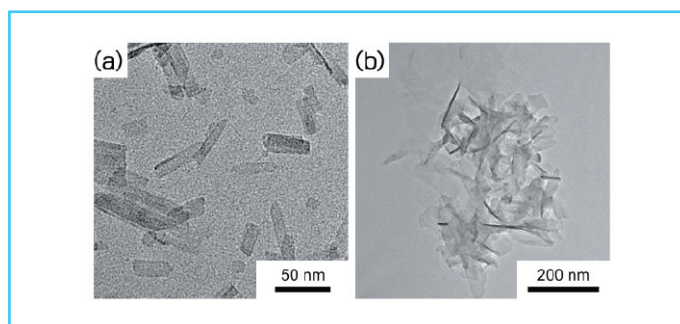


Fig. TEM images of the obtained nano-sized calcium phosphate crystals.

**Kimiyasu Sato**  
Advanced Manufacturing  
Research Institute  
E-mail: sato.kimiyasu@  
aist.go.jp

AIST Today  
Vol.5 , No.2 (2005) 22