

A Successful Preparation of Magnetic Nanotubes by Means of Intense Magnetic Field

γ -Fe₂O₃ magnetic nanotubes were prepared successfully for the first time by Ma Yanwei, who is the PI of the research group from the Key Laboratory of Applied Superconductivity, Institute of Electrical Engineering, Chinese Academy of Sciences (CAS). The research results have been published on the journal of Chemistry of Materials issued by the American Chemistry Society and represent another accomplishment obtained by the group on the synthesis of new materials in the extreme conditions of intense magnetic field. Ma's research was funded by NSFC and CAS.

The γ -Fe₂O₃ magnetic nanotubes with a diameter of 300nm and a length of 30 μ m show the typical ferromagnetism at room temperature as well as better crystallinity. Comparing the reported methods of nanotubes fabrication, Ma's new approach to produce nano-materials is simple, efficient and controllable.

Recognized by international peers as exploratory work, the approach has already been granted a patent in China.

As a rising cross-disciplinary research, the material science under intense magnetic field has been given more and more attention all over the world. New scientific opportunities harbor under the extreme conditions, and it is of great significance for the scientific progress as well as the development and application of new technologies and new materials. Currently, the application of intense magnetic field in material science has touched upon new materials such as superconductive material, magnetic material, nano material, etc. Therefore, experts in the intensive field laboratory of the United States have called it the science, engineering and technology of the 21st Century.

(Quoted from NSFC Web.)

Progress Made in the Studies of Novel Materials for Organic Semiconductors

Co-funded by NSFC, Ministry of Science & Technology of China (MOST) and the Chinese Academy of Sciences (CAS), researchers at the Key Laboratory of Organic Solids, ICCAS, made progress in designing and synthesis of n- and p-type organic semiconductors. The research findings were published recently on the Journal of American Chemical Society (JACS).

Organic semiconductor materials as the heart element of preparing photo-conducting devices are critical. Considering the study and application of molecular devices, it is significant and useful to design and synthesis organic semiconductor materials with high mobility, stability and malleability. Perylene-3,4:9,10-tetracarboxylic diimide (perylene bisimide, PBI) is a potential material for electron transporting and

has been applied in a wide range of applications including organic light-emitting diode (LED), solar battery and organic field-effect transistors (OFETs). Therefore, the high performance n-type semiconductors with novel structures and special characters can be prepared using PBI unit. Starting from tetrachloro-PBI, ICCAS researchers synthesized a variety of PBI derivatives doped with dithiophene by Stille Reaction. The self-assembly behaviour of these derivatives in solid state can be modulated by guest molecules (see the cover paper: Chem. Comm., 2006, 4587—4589). Stimulated by this result, the researchers discovered a kind of transition metal system with highly active tetrachloro-PBI. The system might conduct homocoupling of 2 mole PBIs through short molecular axis to construct full extended conjugated di-PBI