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 30μm 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 derivates doped with dithiophene by Stille Reaction. The self-assembly behaviour of these derivates 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

compounds as the potential electron transporting materials, which possess the broad absorption in the region of visible light and the strong electron-accepting ability characterized by electro-chemistry methods (see J. Am. Chem. Soc., 2007, 129, 10664—10665). A Chinese patent on the research is also been applying.

The researchers designed and synthesized a series of functional organic small molecules based on S-heterocyclic PBIs by the reaction of fused-ring aromatic compounds with thiophene. The thin-films of S-heterocyclic PBIs are expected to serve as the p-type organic semiconductors. Introducing thiophene unit into the functional molecules, its single-crystal micrometer wires have unique double-channel superstructure. The cooperative effects between the multi-layer molecular self-assembly result a mobility of the single-crystal micrometer wires up to 0.8 cm2 V-1 s-1 (see J. Am. Chem. Soc., 2007, 129, 1882—1883).

(Quoted from NSFC Web.)

Workshop on Major Research Plan "Several Frontier Issues on Theoretical Physics and its Interdisciplines"

The workshop on the Major Research Plan "Several Frontier Issues on Theoretical Physics and its Interdisciplines" was held in Beijing from January 25 to 26, 2008. This plan was among the first batch of plans launched for the Eleventh Five-Year Plan period (2001—2005), all of its 134 projects are supposed to be concluded by the end of 2008. Present at the workshop were over 100 people, lincluding experts from the academic committee, steering committee, joint disciplinary working groups and conveners of individual disciplinary groups, grantees of projects for 2003—2005 and interested parties.

The opening ceremony was presided over by Academician Ouyang Zhongcan, chair of the academic committee. Prof. Shen Wenqing, Vice President of NSFC, addressed at the opening ceremony. Prof. Shen expressed his appreciation to experts of the committees for their commitment and hard work to the plan over the years and acknowledged their achievements in the field of theoretical physics and relevant interdisciplines. He also expressed the hope that a summary be well made by the committees upon the conclusion of the plan and that no efforts be spared to acquire further government support at certain research directions. Prof. Ji Peiwen, Deputy Director General, Department of Mathematical and Physical Sciences, introduced on behalf of the joint disciplinary working groups, NSFC's requirements on the conclusion, evaluation and acceptance of the Major Research Plan projects, arrangement and procedures of the evaluation for the projects and purposes, mode and main issues of the workshop. Prof. Huang Tao, on behalf of the steering committee, made report on the implementation of the plan in 2007. According to Prof. Huang, significant progress was achieved in 2007, with 420 papers published, among which 76 had an influential factor over 4, which accounts 18% of the total. The research plan has formed 9 research directions under 3 categories, which have seen sound progress. Academic exchanges in various forms have been organized and interdisciplinary collaboration enhanced. The report also presented studies and reflections on theoretical physics and its interdisciplines, as well as research arrangement for 2008.

Four keynote reports were given respectively by Prof. Shen Wenqing on "Nuclear Science and Interdisciplinary Research", Prof. Jin Shan, CAS Institute of High Energy on "Opportunities and Challenges—BES and the Physics", Prof. Yu Jun, CAS Beijing Genomics Institute on "Life Science Frontier: Genomics and Bio-informatics in Close Collaboration" and Prof. Fang Zhong, CAS Institute of Physics on "Study on Quantum Phenomenon of Self Spinning and Orbit". These reports highlighted relevant disciplinary situations at home and abroad and the frontier development, presented questions and demands for certain research in theoretical physics and attracted massive attention from representatives to the work-