

Solid State Physics on Nanonetwork Solids

Academic Staff

Professor Katsumi Tanigaki (from March)

Post Doctoral Fellow Ryotaro Kumashiro (CREST, JST)

Graduate Students Junji Takeuchi (D1 to September)
 Toshinari Hirai (M2)
 Takao Yamamoto, Keisuke Kobayashi,
 and Shinya Yoshikawa (M1)

Research Activities

Structure and electronic properties of IVth-group cluster solids with polyhedral networks

(*K. Tanigaki*)

The pairing mechanism in two classes of cluster superconductors, C₆₀ and Si₄₆ solids was determined to be phonon mediated BCS mechanism with s-wave symmetry. [3]

Publications

- [1] *Metallic phase in potassium fulleride K_xC₇₀*,
 T. Hara, M. Kobayashi, Y. Akahama, H. Kawamura, M. Kosaka and K. Tanigaki, Phys. Rev. B. **68** (2003) 045401:1-4.
- [2] *N-channel field effect transistors with fullerene thin films and their application to a logic gate circuit*,
 T. Kanbara , K. Shibata , S. Fujiki, Y. Kubozono, S. Kashino, T. Urisu, M. Sakai, A. Fujiwara, R. Kumashiro, K. Tanigaki, Chem Phys. Letters, **379** (2003) 223-229.

- [3] *Mechanism of superconductivity in the polyhedral-network compound Ba_8Si_{46} ,*
K. Tanigaki, T. Shimizu, K. M. Itoh, J. Teraoka, Y. Moritomo and S. Yamanaka, *Nature Materials* **2** (2003) 653-655.
- [4] *Structure and physical properties of C_{60} field effect transistor,*
K. Tanigaki, H. Ohashi, R. Kumashiro, K. Kato, S. Aoyagi, S. Kimura and M. Takata, *Proc. of the ECS meeting, recent advancement of fullerenes and nanotubes*, **106** (2003) 155-158.
- [5] *Low-angle X-ray diffraction study on the relationship between crystallinity and properties of C_{60} FET,*
H. Ohashi, K. Tanigaki, R. Kumashiro, S. Sugihara, S. Hiroshiba, S. Kimura, K. Kato and M. Takata, *Appl. Phys. Lett.*, **84** (2004) 520-522.
- [6] *Azafullerene $(C_{59}N)_2$ thin-film field effect transistors,*
R. Kumashiro, K. Tanigaki, H. Ohashi, N. Tagmatarchis, H. Kato, H. Shinohara, T. Akasaka, K. Kato, S. Aoyagi, S. Kimura and M. Takata, *Appl. Phys. Lett.*, **84** (2004) 2154-2156.

Master Thesis (2004.3)

M1) *properties and thin film structure of C_{60} field effect transistors,*

H. Ohashi

M2) *Structure and properties of rare-earth metal doped C_{60} fullerenes,*

T. Hirai