

## Professor T. Takahashi -- Discovery of a New Topological Insulator--

### -Significant step toward the development of next-generation low-power consumption devices -

A research group led by Professor Takashi Takahashi at WPI Advanced Institute for Materials Research, Tohoku University, Associate Professor Takafumi Sato at Graduate School of Science, Tohoku University, Associate Professor Kouji Segawa, Professor Yoichi Ando at the Institute of Scientific and Industrial Research, Osaka University discovered a new material with the largest band gap among topological insulators that have attracted special attention for application to next-generation low-power consumption devices.

The present finding opens up a possibility to discover topological insulators in other materials, while having been observed only in limited materials. In addition, different types of topological insulators are expected to be discovered by searching materials with the same crystalline structure as TlBiSe<sub>2</sub> (thallium, bismuth and selenium). It could also be possible to control Dirac electrons on the surface to develop multifunctional spintronics devices by substituting constituent atoms of TlBiSe<sub>2</sub> with different atoms.

The research result was accepted in the October 1 issue of Physical Review Letters by American Institute of Physics and will be published online soon.

[Contact] (About the research)

Associate Professor Takafumi Sato  
Graduate School of Science, Tohoku University,  
TEL: +81-22-795-6477  
E-mail: t-sato\*arpes.phys.tohoku.ac.jp (Replace \* with @)

Professor Yoichi Ando  
The Institute of Scientific and Industrial Research, Osaka University  
TEL: +81-6-6879-8440  
E-mail: y\_ando\*sanken.osaka-u.ac.jp (Replace \* with @)

Professor Takashi Takahashi  
WPI Advanced Institute for Materials Research, Tohoku University  
TEL: +81-22-795-6417  
E-mail: t.takahashi\*arpes.phys.tohoku.ac.jp (Replace \* with @)

(About JST projects)

Naoki Nagata  
Department of Inclusive Research Administration, Innovation Headquarters,  
Japan Science and Technology Agency (JST)  
Address: Sanban-cho building, 5 Sanban-cho Chiyoda-ku, Tokyo, 102-0075,  
Japan  
TEL: +81-3-3512-3524, FAX: +81-3-3222-2064  
E-mail: crest\*jst.go.jp (Replace \* with @)