

## Progress in Iodine-based phosphors and p-type semiconductors

H. Hosono

*Materials Research Center for Element Strategy,*

*Tokyo Institute of Technology, 4259 Nagatsuta, Midori, Yokohama 226-8503, Japan*

Iodine anion has a unique characteristic of largest ionic radius (i.e., largely spread valence electron orbitals) among all the elements. This feature makes it easy to overlap between I-5p orbitals even in conventional crystal structure. In addition, its electro-negativity is lowest among halogens. Thus, the chemical bonding with post-transition metals have significant covalent nature.

Iodide materials have large potential as the platform to realize high performance optoelectronic properties which are difficult to impart. High photoluminescence arising from band gap-excitation and wide gap p-type conduction.

In this talk I introduce our research on the following:

1. New CuI-based phosphor materials with 0/1D nature and highly efficient LEDs realized by a combination of iodine perovskites as light emitter with amorphous oxide semiconductors as carrier confinement and electron-transport layer.

2. High-Performance P-channel tin halide perovskite thin film transistor utilizing a 2D/3D core-shell structure