



Energy conversion technology that contributes to achieving carbon neutrality

Future Energy Division, Laboratory for Zero-Carbon Energy

<http://www.zc.iir.titech.ac.jp/~takasu.h/>

- Development of next generation cell for direct electrolysis of CO₂
- Development of metal hydrogen separation membranes for ultra-pure hydrogen production
- Development of ammonia storage materials for energy storage



Research and development of related technologies is being conducted around the world toward the realization of carbon neutrality. In particular, energy conversion and storage technologies are becoming increasingly important. In this laboratory, we are working on the development of materials related to the use of electrical energy for material conversion and the production of energy media. Specific research themes include the development of carbon dioxide direct electrolysis cells that can be scaled up to a large scale, the development of metallic hydrogen separation membranes for ultra-pure hydrogen production, and the development of ammonia storage materials.

Direct CO₂ electrolysis

- Efficient carbon dioxide conversion technology using solid oxide cells
- Development of original cells using a method that can be scaled up to a large scale

Hydrogen separation membrane

- Development of a composite layer structure with a hydrogen separation layer to obtain excellent hydrogen separation performance and a porous support layer to maintain the strength of the entire membrane.

- Smooth Pd alloy surface
- High adhesion to support

Ammonia storage material

- Development of storage materials for ammonia, which is important as an energy medium and carrier.
- Expected to make handling easier and safer by using chemical reactions