



**PRESS RELEASE (2017/08/03)**

## A new synthesis route for alternative catalysts of noble metals

Researchers have developed a new synthesis route for alternative catalysts of noble metals for versatile chemical reactions that could help address environmental concerns.

Noble metals such as platinum are useful as catalysts for versatile chemical reactions including fuel cell vehicles and reduction of CO<sub>2</sub> emission. However, they are costly to be used for these purposes.

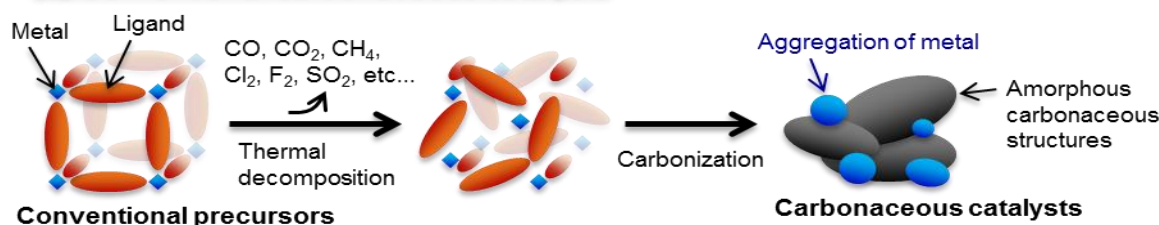
As inexpensive alternatives, organic-based catalysts and carbonaceous catalysts were explored, but both were ultimately found to be impractical. This was because organic-based catalysts tend to be active but unstable, while carbonaceous catalysts are stable but less active.

In this work, researchers believe to have found a solution by developing a new synthesis route for intermediate materials of organic-based catalysts and carbonaceous catalysts.

While conventional carbonaceous catalysts have amorphous carbonaceous structures that cause a decline in catalytic activities (Fig. 1a), the new synthesis route enables the formation of carbonaceous catalysts with controlled chemical structures like organic-based catalysts (Fig. 1b). This synthesis route is capable of developing alternative catalysts of noble metals for many eco-friendly technologies such as fuel cell vehicles, hydrogen generation from water and CO<sub>2</sub> reduction.

“Network Joint Research Center for Materials and Devices” is a center to deepen and create new framework for the collaborative research among five different research institutes. This research was conducted through the “Five-Star Alliance research program” of the research center.

### (a) Conventional carbonaceous catalysts



### (b) This work

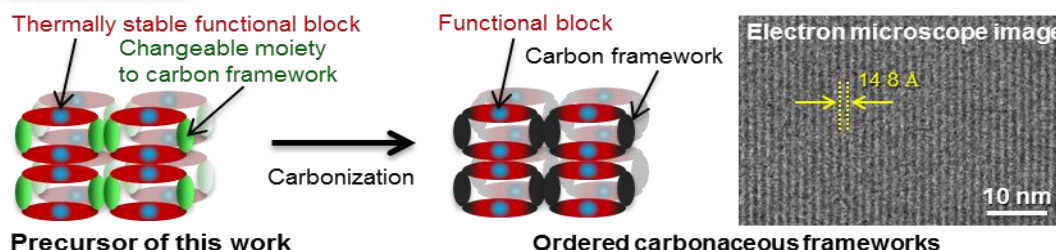


Fig. 1 Synthesis schemes of (a) conventional carbonaceous catalysts and (b) this work for ordered carbonaceous frameworks.

#### 【Contact】

Fumito Tani, Associate Professor  
Laboratory of Chemistry of Molecular Assembly,  
Institute for Advanced Materials Engineering,  
Kyushu University  
Email: [tanif@ms.ifoc.kyushu-u.ac.jp](mailto:tanif@ms.ifoc.kyushu-u.ac.jp)

Hiroto Nishihara, Associate Professor  
Kyotani laboratory, Institute of  
Multidisciplinary Research for Advanced  
Materials, Tohoku University  
Email: [hirotomo.nishihara.b1@tohoku.ac.jp](mailto:hirotomo.nishihara.b1@tohoku.ac.jp)