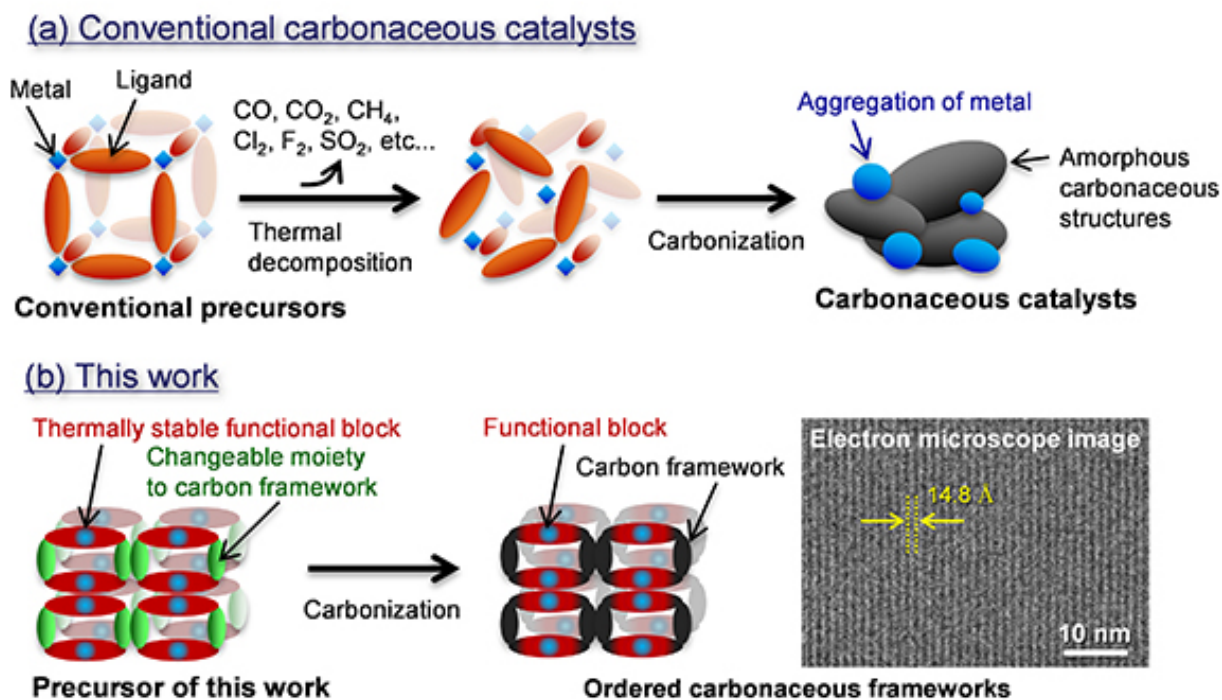


A new synthesis route for alternative catalysts of noble metals

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Synthesis schemes of (a) conventional carbonaceous catalysts and (b) this work for ordered carbonaceous frameworks. Credit: Hiroto Nishihara

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 CO₂ emission. However, they are too costly to be used for these purposes.

As inexpensive alternatives, organic-based catalysts and carbonaceous catalysts were explored, but 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 they 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 CO₂ reduction.

More information: Hirotomo Nishihara et al, Synthesis of ordered carbonaceous frameworks from organic crystals, *Nature Communications* (2017). [DOI: 10.1038/s41467-017-00152-z](https://doi.org/10.1038/s41467-017-00152-z)

Provided by Tohoku University

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