Sustainable and resilient social system for healthy nature

Realization of Resource/Energy Circulation Society and Establishment of Energy Independence through Power-to-X Using Biomass-Derived Electrocatalysts

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Summary :

Toward full utilization of renewable energy, Power-to-X (energy conversion and storage technology) is the serious bottleneck which is caused by catalyst with high cost and mineral resources restriction risk. This study aims to develop a catalyst for the direct synthesis of methane, a type of synthetic fuel, using nano blood-charcoal catalysts produced by pyrolyzing waste biomass materials such as cellulose derived from sea pineapple shells, dried blood meals, and seaweeds. The catalyst's atomic and molecular structures will be optimized to achieve performance that surpasses conventional catalysts.

In addition, electrodes and cell stacks incorporating this catalyst will be developed to demonstrate synthetic methane production in an electrolyzer system. Furthermore, by establishing an integrated supply chain—from the collection of waste biomass to catalyst synthesis, the development and manufacturing of electrodes and electrolyzer systems, and the distribution of synthetic methane—this project aims to realize a resource- and energy-circulating society that enables both energy selfsufficiency and decarbonization in Japan through the expansion and full utilization of renewable energy.

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