

Returnee's Report

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Program Report

<Program Contents>

“ Carbon Dioxide Activation by Nickel Macrocycles ”

The reduction and storage of carbon dioxide is an important area relevant to the solution of problems related to global warming and the depletion of fossil fuels. Electrochemical activation of carbon dioxide promoted by transition-metal complexes is studied actively. In particular, the cobalt and nickel complexes using macrocycle ligand which have been studied by Fujita and her co-workers closely are leading-edge research. Therefore, we tried to synthesize a nickel macrocycle complex: [Ni(1,8-dimethyl-1,3,6,8,10,13-hexaazacyclotetradecane)](PF₆)₂ by template method and characterized of the electrochemical properties by cyclic voltammetry. In addition, we studied electrochemical reduction of carbon dioxide by nickel macrocycle complex under carbon dioxide atmosphere.

<Achievements/Ambitions>

We succeeded in synthesis of the target compound nickel macrocycle complex, which was characterized by NMR spectroscopy and cyclic voltammetry. Additionally, we also succeeded in observation of catalytic current of reduction of carbon dioxide under carbon dioxide atmosphere. We accomplished electrochemical reduction of carbon dioxide using transition metal complex during the term of this dispatch. In the future, we have to study and discuss on the reaction mechanism of carbon dioxide and try to optimize reaction condition. And I want to apply the experience and know-how obtained from this international training program for the subject of my future research of a development of small molecular activation catalyst.



I studied this building. (There are many geese in front of the building.)



A winery near Brookhaven national laboratory (long island)



Electrochemical apparatus