

Study on developments of highly efficient selective oxidation and fuel cell oxidation catalysts and their real-time structure analyses

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【Outline of survey】

The aim of this study is to develop highly efficient catalysts for selective oxidation, asymmetric oxidation, CO selective oxidation under excess H₂ in fuel cell, and oxygen electrode reaction in fuel cell by taking advantage of time-resolved x-ray absorption fine structure technique which can provide element-specific structural information relevant to high catalytic performances and by exploiting new catalyst preparation methods. The study attempts to elucidate active structures and deactivation factors in selective oxidation, asymmetric oxidation, and fuel cell oxidation catalyses, which are important issues to be solved in relation to resource, energy, and environmental problems.

【Expected results】

In this study, based on unique catalysts and new phenomena discovered by us and taking advantage of a time-resolved structure analysis technique preceded by us, we develop novel selective oxidation catalysts and fuel cell oxidation catalysts, which provide novel environmental-friendly processes for sustainable human life.

【References by the principal researcher】

- "In Situ Characterization of Supported Metal Catalysts and Model Surfaces by Time-Resolved and Three-Dimensional XAFS Techniques", Y. Iwasawa, *J. Catal.*, **216**, 165-177 (2003).
- "Chiral Self-Dimerization of Vanadium Complexes on a SiO₂ Surface for Asymmetric catalytic Coupling of 2-Naphthol: Structure, Performance, and Mechanism", M. Tada, Y. Iwasawa, et al., *J. Phys. Chem. B*, **109**, 9905-9916 (2005).

【Term of project】 FY2006 - 2010

【Budget allocation】 31,100,000 yen

【Homepage address】 <http://www.chem.s.u-tokyo.ac.jp/~yiwsylab/INDEXeng.htm>