Frontier Chemistry Center
フロンティア化学教育研究センター

講演会

演 題：**Structure Sensitivity in Metal Catalysis**

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日 時：2016 年 6 月 16 日（木）13:00~14:30

場 所：フロンティア応用科学研究棟・セミナー室 1

要旨： Catalysis is the science and technology of the control of the change in the molecular structure of reactants to products (“chemical reaction”) by functional materials (“the catalyst”). Catalysts not only accelerate the chemical reaction, they also steer the direction of chemical transformation on the energy landscape and therefore selectivity. One of the great challenges to heterogeneous catalysis is to understand the dependence of the activity, selectivity and stability of catalytic reactions on particle size and shape. The nanoscale dimensions of metal particles in catalysts result in a very high reactive surface area. The intriguing aspect of nanoparticle catalysis is that unique behavior appears when they become smaller than 10 nm. In this regime their surface contains a significant fraction of surface atoms with a lower coordination number (corners and edges) than terrace atoms, exhibiting a dramatically different activity and selectivity. On nanoparticles the surface atoms may also form unique topologies such as step-edge sites.

In the lecture, modern insights about structure sensitivity in heterogeneous catalysis will be highlighted using several case studies on methane steam reforming and the Fischer-Tropsch reaction. Due to rapid advances in computing power we can now also describe reactivity of supported systems. Two examples will be highlighted, that of carbon monoxide oxidation on ceria-supported metal nanoparticles and ethanol oxidation on gold supported on a Cu-containing spinel support.

本講演は、大学院総合化学院『化学研究先端講義（修士課程選択科目）／総合化学特別研究第二（博士後期課程選択科目）』の一部として認定されています。

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