# 第317回触媒化学研究センターコロキウム

共催　日本化学会北海道支部・電気化学会北海道支部

CRC

# Electrocatalysis: from single crystals to single nanoparticles


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（創成科学研究棟4階セミナー室B・C）

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The surface science approach to electrocatalysis is very useful in understanding the structure sensitivity effect for a number of well-known electrocatalytic redox reactions. We discuss here the important distinction between two types of structure sensitivity:
(i) reactions that prefer defects in (111) facets, typically those involving O-H and C-H bond making and breaking, such as methanol oxidation and carbon monoxide oxidation on platinum electrodes;
(ii) reactions that prefer (100) terraces, typically those involving C-C, C-O, N-N, and N-O bond making and breaking, such as ammonia oxidation and nitrite reduction on platinum and carbon monoxide reduction to ethylene on copper electrodes.
These observations have associated implications for nanoparticle design, in particular in relation to shape-controlled nanoparticle synthesis. Finally, we will show how the measurement of electrocatalysis at a single nanoparticle can be performed, including a discussion of the associated complications, and how nanoparticles can be synthesized with control of size, shape and composition, by a new electrochemical method employing extremely cathodic potentials.



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