shown in Figure 1. The stability of the CH₃(ads) on rhodium should be a key point, the rhodium site being affected by the interior negatively charged selenium (-1 ~ -2 by XPS) (12). The "rhodium selenide"-like electronic state inhibited methane formation, but tuned the reaction path to ethanol by promoting the C-C bond formation of CH₃ with the carbonyl derivative.

Summary
Controlling the reaction path of CO₂ + H₂ to give ethanol was found to be possible due to the presence of carbon, oxygen, selenium, lithium and iron around rhodium sites. Electronic control by selenium for ethanol formation was investigated by several techniques, and electronic modification of the platinum metal cluster from within should be applicable to other systems.

References

Hexagonal Nanostructured Platinum

Hexachloroplatinic acid and ammonium tetra-chloroplatinate were added to the surfactant, octaethylenglycol monohexadecyl ether, which was used to prepare the lyotropic liquid-crystalline phases because it forms a wide hexagonal mesophase. The platinum salts were reduced, forming platinum powder of particle size 90 to 500 nm of hexagonal nanostructure with cylindrical pores 30 Å in diameter, separated by 30 Å thick platinum walls. The lyotropic phase may act as a structure-directing medium. Platinum is stabilised at the hydrophobic-hydrophilic interface as small colloidal particles which agglomerate and coalesce to a stable wall thickness. Only fast reductions allow this structure to form before the liquid-crystal phase rearranges.

This nanostructured platinum is mesoporous and of large surface area – features useful for catalytic, fuel cell and sensor applications.