第221回触媒化学研究センター談話会

演　題：**Gold-silver Alloy Nanocatalyst for Low Temperature CO Oxidation**

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１１：００―１２：００

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５階 大会議室

要　旨：A novel highly active gold-silver alloy catalysts supported on mesoporous aluminosilicate, Au-Ag@MCM-41 synthesized by two different approaches, were developed. They both have high reactivity for CO oxidation near room temperature. The most distinctive performances of the catalyst are that the catalytic activity is dependent on the Au/Ag ratio, the Al content of the support and the pretreatment conditions. With respect to Au/Ag content, there is a strong synergetism in catalytic effect; that is, the alloy nanocatalyst exhibits higher activity than the pure gold or silver nanoparticle.

Besides the chemical composition of Au/Ag ratios, the Al content in the support also affects the catalytic activity. The reaction rate increases with the Al content in the support, and attains the highest value when Al/Si ratio in support is 0.042. With a further increase of Al content, the reaction rate drops down again. This may change the interaction between Au-Ag alloy nanoparticles and the support, thus change the O_2 adsorption on the catalyst surface. Our ESR results support this assumption.

The above activity over Au-Ag@MCM was obtained after high-temperature H_2 pretreatment. We found that the high-temperature H_2 reduction was necessary for the evolution of catalytic activity. The reduction temperature has a remarkable influence on the catalytic activity.

Finally, I will present our recent results on preferential oxidation (PROX) of carbon monoxide catalyzed by the Au-Ag nanoparticles supported on mesoporous silica. It gave excellent activities at temperature below 100 ^{o}C with very good selectivity. The catalysts were characterized by 3-D electron nanotomography, EXAFS and DRIFT studies.

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