

# XAFS Characterization of Industrial Catalysts: Cu-ZnO<sub>x</sub>/SiO<sub>2</sub> Catalyst for ester hydrogenolysis

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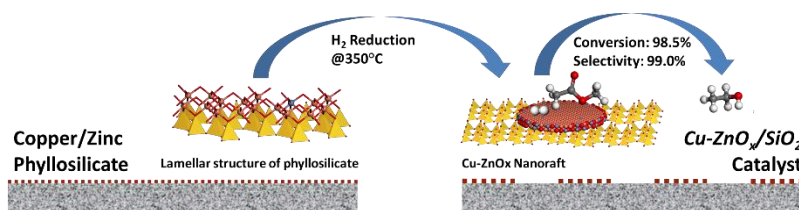
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## Introduction

Zinc-doped Cu/SiO<sub>2</sub> catalyst is primarily chosen for carbonyl hydrogenation in petrochemical and coal-based chemical industry. The valence states of copper and zinc, the local structure of alloyed Cu-ZnO<sub>x</sub> (or perhaps not alloyed), the stability of active center, -- all these are still controversial and challengeable for traditional laboratory due to the limit for nanosized structure and in situ characterization. [1,2]

In this investigation, the valence states and local structure of Cu-Zn/SiO<sub>2</sub> and Cu/SiO<sub>2</sub> catalyst during hydrogen reduction at temperatures in the range of 20°C to 350°C has been studied by *in situ* X-ray absorption spectroscopy characterization. In combination with laboratory characterization such as HAADF-STEM, EDX mapping, FTIR, and XRD etc., a double-layer nanoraft structure of Cu-ZnO<sub>x</sub> was proposed during the reduction of mixed copper-zinc phyllosilicate.



**Figure 1** formation of double-layer nanoraft from mixed copper/zinc phyllosilicate.

## References

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2. Chen, L. F.; Guo, P. J.; Qiao, M. H.; Yan, S. R.; Li, H. X.; Shen, W.; Xu, H. L.; Fan, K. N. *J. Catal.* **2008**, *257*, 172.