

# Deactivation of supported copper catalysts for methanol synthesis

M. Kurtz, H. Wilmer, T. Genger<sup>\*</sup>, O. Hinrichsen<sup>\*\*</sup> and M. Muhler

*Ruhr-University Bochum, Laboratory of Industrial Chemistry, D-44780 Bochum, Germany*

Binary Cu/ZnO and Cu/Al<sub>2</sub>O<sub>3</sub> as well as ternary Cu/ZnO/Al<sub>2</sub>O<sub>3</sub> catalysts were investigated with respect to their catalytic activity and stability in methanol synthesis. In a rapid ageing test, activity measurements were carried out in combination with the determination of the specific Cu surface area. A close correlation between the loss of catalytic activity and the decrease in specific Cu surface area was found due to sintering of the Cu particles. Differences within the deactivation behavior and the area-activity relationship of every catalyst system imply that the catalysts should be grouped in different classes.

**Keywords:** deactivation, Cu/ZnO catalyst, Cu/ZnO/Al<sub>2</sub>O<sub>3</sub> catalyst, Cu/Al<sub>2</sub>O<sub>3</sub> catalyst, methanol synthesis, N<sub>2</sub>O reactive frontal chromatography (N<sub>2</sub>O RFC)