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Understanding gold catalysts under working conditions

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The number of publications reporting the application of gold to catalytic processes has increased dramatically since the discovery in the 1980's that supported nanoparticles of gold can be very active catalysts for industrially important reactions [1,2]. Despite the tremendous progress in the field in terms of catalyzed reactions, understanding of the catalytic behaviour of heterogeneous gold under working conditions is very limited, which often yields to attribution of its catalytic properties to erroneous sites. With the help of XAS/XES performed under working conditions we were able to understand what happens during the induction period observed with Au/C used in the carbonilation of methanol, what the active oxidation state of gold is in the hydrogenation of nitrobenzene, and help redesign catalysts for the selective hydrogenation of olefins.

[1] M. Haruta, T. Kobayachi, H. Sano, N. Yamada, Chem. Lett. 2, 405 (1987).

[2] M. Haruta, Nature 437, 1098 (2005).

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Heterogeneous catalysis

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Talk

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