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[214] Comparison of single Rh adatoms on α -Fe₂O₃(1-102) and TiO₂(110) stabilized by adsorbed water

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Despite its high cost, rhodium is a widely applied catalyst. So-called single-atom catalysis offers an opportunity to reduce the amount of Rh required for traditional heterogeneous catalysis, and a path to heterogenize homogeneous reactions.

Using STM, nc-AFM and XPS we compare the stability of Rh adatoms on two different model supports: α -Fe₂O₃(1 $\bar{1}$ 02) and TiO₂(110), both after metal deposition in UHV and in a 2×10^{-8} mbar water background. We show that the Rh adatoms on α -Fe₂O₃(1 $\bar{1}$ 02) sinter in UHV, but are stabilized by water up to 150 °C through coordination to 2–3 OH ligands. In contrast, Rh adatoms on TiO₂(110) could not be stabilized above room temperature.

Primary author: HAAGER, Lena (TU Wien)

Co-authors: Mr KRAUSHOFER, Florian (TU Wien); Mr EDER, Moritz (TU München); Mr RAFSANJANI-ABBASI, Ali (TU Wien); Dr FRANCESCHI, Giada (TU Wien); Dr RIVA, Michele (TU Wien); Mr SOMBUT, Panukorn (TU Wien); Mrs MARLENE, Atzmüller (TU Wien); Prof. SCHMID, Michael (TU Wien); Prof. FRANCHINI, Cesare (Università di Bologna); Prof. DIEBOLD, Ulrike (TU Wien); Prof. PARKINSON, Gareth S. (TU Wien)

Presenter: HAAGER, Lena (TU Wien)

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