Synchrotron radiation spectroscopy studies of the initial interaction between cobalt and titanium dioxide —

Sebastian Müller and Dieter Schmeisser — BTU Cottbus, Konrad-Wachsmann-Allee 1, 03046 Cottbus

Small metallic particles deposited on oxide surfaces can serve as heterogeneous catalysts, as for example TiO₂ supported cobalt is a known Fischer-Tropsch-Catalyst.

The goal of the presented studies is to investigate the interaction between cobalt and TiO₂ in the initial step of growth by synchrotron radiation based spectroscopy.

PES studies of TiO₂ supported cobalt show a reduction of the oxide support, accompanied by an oxidation of the deposited material. The oxidation is not complete, but metallic cobalt is found already in the very first step of growth. Uniform decrease of both substrate PES lines indicate very weak interaction between overlayer and TiO₂.

An atomic multiplet calculation including charge transfer and crystal field effects is applied to simulate the experimental Co 2p XAS and XPS spectra of the oxidized component. The results allow the identification of the local coordination as well as the identification of the oxidation state of cobalt.

Part: O
Type: Vortrag; Talk
Topic: Oxides and insulators: Epitaxy and growth
Email: sebastian.mueller@tu-cottbus.de