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Electronic structure of nano-sized iron oxide particles measured by scanning tunneling- and photoelectron spectroscopy MARCUS PREISINGER, Lehrstuhl für Experimentalphysik II, Universität Augsburg, 86135 Augsburg, Germany, MICHAEL KRISPIN, TORSTEN RUDOLF, SIEGFRIED HORN — We have investigated the electronic structure of nano-sized iron oxide by scanning tunnelling microscopy (STM) and spectroscopy (STS) as well as by photoelectron spectroscopy (PES). Nano particles were produced by thermal treatment of Ferritin molecules containing a self-assembled core of iron oxide. Depending on the thermal treatment we were able to prepare different phases of iron oxide nanoparticles resembling γ-Fe_2O_3, α-Fe_2O_3, and a phase which apparently contains both γ-Fe_2O_3 and α-Fe_2O_3. Changes to the electronic structure of these materials were studied under reducing conditions. We show that the surface band gap of the electronic excitation spectrum can differ from that of bulk material and is dominated by surface effects.

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