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Supported Oxide Nanoparticles: study of the structure-activity relationships

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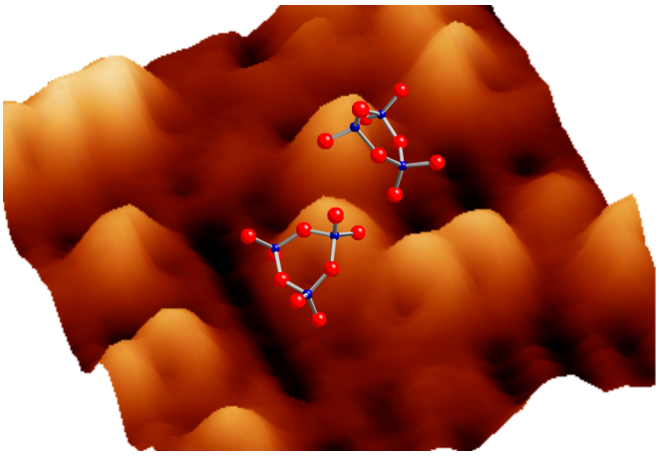
In order to get insight into the elementary processes underlying catalytic reactions at the atomic level surface science approach has been developed over the last two decades. The surface science approach, which is based on using well-defined single crystal surfaces, has in general a problem relating the data for model system to a real catalyst – so-called "materials gap" problem. To overcome this difficulty researchers have turned recently to the model systems made out of nanoclusters supported on single crystal surfaces. In this talk we will focus our attention on the metal oxide ordered surfaces and metal oxide nanoclusters grown or deposited on the well-ordered metal oxide substrates. The results presented here were obtained by groups of scientists working in the Pacific Northwest National Lab, Richland, WA, USA and Fritz Haber Institute, Berlin, Germany who by employing the combination of STM, XPS, TPD, IRAS experimental techniques and DFT calculations have tried to shed light on the structure-activity relationships for the model systems of $WO_3/TiO_2(110)$, $VO_x/CeO_2(111)$, $Au/CeO_x/SiO_2(111)$, $Au/SiO_x/SiO_2(111)$.



$(WO_3)_3$ clusters with cyclic structure (D_{3h}) on $TiO_2(110)$