

Title: Role of surface defects in ceria-based catalysis

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Abstract: This work concentrates on the analysis of fundamental physicochemical properties of Pt-CeO_x, single-atom Pt¹/CeO_x, and inverse CeO_x/Cu(111) catalysts. Preparation method for stabilized atomically-dispersed Pt²⁺ ions on ceria was developed and adsorption sites for Pt ions were thoroughly studied using advanced surface science techniques supported by theoretical methods. The mechanism of Pt²⁺ stabilization on ceria steps was revealed and the step capacity towards Pt²⁺ ions was estimated. Also, the preparation method for well-ordered cerium oxide ultrathin films with different stoichiometry and ordering of surface oxygen vacancies was developed, and the Ceria/Cu(111) interaction was investigated.

Key words: heterogeneous catalysis, model systems, single-atom catalysis, platinum ions, cerium oxide.