Systematic Synthesis and Catalytic Performance Tests of Defined Noble Metal Species on Powder Support

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Supported noble metal catalysts are complex systems whose performance depends on various material parameters and synergistic effects [1]. Herein, the influence of Pt nanoparticles (NPs) size and the effect of anisotropic CeO_2 support on CO oxidation are addressed. Furthermore, the stability and catalytic performance of bimetallic Pd-Pt catalysts on CeO_2 supports for emission control applications are reported visualizing the role of the Pt-Pd interaction.

The results obtained in our studies indicate a high impact of the surface noble metal concentration (SNMC) and surface defects on the stability of Pt_{17} clusters on anisotropic CeO_2 supports and, consequently, on the low temperature activity for CO oxidation. Similarly, for bimetallic Pt-Pd catalysts a variation in the catalytic performance was noticed depending on the initial Pt-Pd alloying degree and support morphology. Upon applying a pre-reductive treatment, the impact of CeO_2 support was noticed especially on the long-term stability of the mono and bimetallic catalysts.

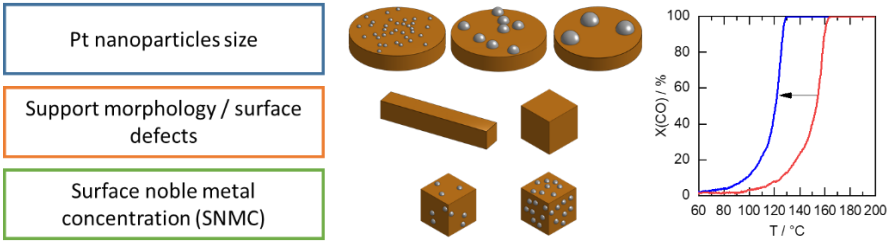

Figure 1: Investigation of the influence CeO_2 morphology Pt based catalysts for CO oxidation.

[1] F. Maurer et al., ACS Catal. 2022, 12, 2473.