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BOOK OF ABSTRACTS

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DRIFT+MS Quantitative Study of the CO Oxidation on Gold supported on Ceria

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The steps of the CO oxidation reaction on a Au/CeO_2 catalyst was quantitatively investigated using a novel DRIFT cell/micro-reactor. The design and characterization of this DRIFT cell/micro-reactor, coupled with mass spectrometry, to perform operando and transient studies of reactions at the gas/solid interface is presented. The cell was modeled and experimentally validated to obtain kinetic parameters of reactions under true chemical control conditions. Light-off curves of activity vs temperature, step-reaction and excitation modulation spectroscopy (MES) experiments were carried out. TOF and apparent activation energy were identical to the measured using a conventional reactor. The simultaneous detection of gas phase concentrations by MS and the intensity of the IR signals allowed the quantification of surface species active in the reaction: i) Au^0-CO (2110 cm^{-1}), Au^+-CO (2125 cm^{-1}), ii) carbonate adsorbed on the ceria support (1700-1200 cm^{-1}). Moreover, the amount of adsorbed oxygen could also be quantified. Kinetic constants of CO adsorption and oxidation were measured.