

Turkish Journal of Chemistry

Turkish Journal

Kinetics of CO oxidation over Pt-CeO_x supported on air-oxidized activated carbon

of

Chemistry

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Abstract: Kinetics of low-temperature CO oxidation was studied under atmospheric pressure at 383 K in the initial rates region over 1wt%Pt-1wt%CeO_x supported on air-oxidized activated carbon (AC2). Feed concentrations of 1-5 mol% CO and 1-2.5 mol% O₂ with balance He were used for CO oxidation in the absence of hydrogen. A simple power-function rate expression was obtained with reaction orders of -0.24 in CO and 0.98 in O₂, and a plausible LHHW expression compatible with mechanisms reported in the literature was proposed. Feed concentrations of 5 mol% CO and 2.5 mol% O₂ were used for investigating the effect of the presence of CO₂ or H₂ on CO oxidation rates by partially replacing inert He with 2-4 mol% CO₂ or 10-60 mol% H₂.

Key Words: Carbon monoxide, oxidation, kinetics, Pt-ceria catalysts, activated carbon supports, PROX.

Turk. J. Chem., **33**, (2009), 589-598.

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