

Catalytic Wet Air Oxidation of Carboxylic Acids at Atmospheric Pressure

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Catalytic wet air oxidation of carboxylic acids(maleic acid, oxalic acid and formic acid) was carried out in a batch reactor operated at 160psi or atmospheric pressure. Pt/Al₂O₃ and the sulfonated poly(styrene-co-divinylbenzene) resin were used as catalysts. Maleic acid was proved to be a refractory substance which could not be oxidized on the Pt/Al₂O₃ catalyst at all at atmospheric pressure, and needed high pressure and high temperature operation for its oxidation. On the contrary, oxalic acid and formic acid were readily oxidized into carbon dioxide and water at 353K and atmospheric pressure. The pathways of maleic acid oxidation were proposed, and the conversion of maleic acid into oxalic acid was the rate-determining step. When the sulfonated resin catalyst was present together with the Pt/Al₂O₃ catalyst, maleic acid could be oxidized at 353K and atmospheric pressure. The sulfonated resin catalyst was suggested to hydrolyze maleic acid into readily oxidizable compounds.