

Catalytic activities of corroded metal ions during the supercritical water oxidation of 2-chlorophenol

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In the last two decades, supercritical water oxidation (SCWO) has been actively developed as a means of destroying hazardous organic waste since most organic compounds, as well as the oxidant and combustion gases, are miscible in all proportions with water in supercritical condition, the effective oxidation of organic materials and wastes can be possible in the supercritical water ($P > 221$ bar, $T > 374$ °C). In this research, the catalytic effect of the metal ions that were formed by the corrosion during the supercritical water oxidation of the halogenated hydrocarbons was studied. 2-chlorophenol was selected as a target material and the Total Organic Carbon Analyzer was used to measure the decomposition efficiency. The materials chosen to form metal ions include Titanium Gr7, Inconel 601, Inconel 625, and Nickel which are known for the high corrosion-resistant materials under highly acidic condition. The corrosion test was performed at severe SCWO condition such as near critical temperature, relatively high concentration of Cl-compound and hydrogen peroxide conditions.