

Wet air oxidation of phenol over the TiO₂-supported metal catalysts

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Wet air oxidation is the liquid phase oxidation of organics to the desired end products, CO₂ and H₂O, at high temperatures (125~320°C) and pressures (0.5~20MPa) using gaseous source of oxygen (usually air) as oxidant. Proper catalysts should be developed for the wet air oxidation, in order to moderate the reaction conditions and to change the reaction pathway to the environmentally benign end product. In this study, the wet air oxidation of phenol over the TiO₂-supported metal catalysts were investigated for this purpose. The noble metal catalysts on TiO₂ with 1 wt% and the transition metal oxide catalysts on TiO₂ with 5 wt% loading of each metal were prepared by incipient wetness impregnation method. Their activity for wet air oxidation of phenol was investigated in a batch reactor (150°C, 5.05MPa). The phenol concentration and the TOC concentration of each sample were examined using a HPLC system and TOC analyzer. The catalysts were characterized by N₂ adsorption, XRD, TPO, and TPR experiments.