

**ABSTRACT:**

In this study, four zeolites in H-form (HZSM-5, H-Beta, H-Mordenite, and H-USY) were tested at different operating conditions for removal of phenol and COD by ozonation. The process variables include concentration of phenol in solution, ozonated airflow rates, pH of solution, temperature, and reaction time. According to experimental results, combination of zeolite and ozone was able to remove both phenol and COD effectively compared to without ozone. Zeolite mainly acted as adsorbent, providing surface for reaction between ozone and phenol. However, the adsorption capacity of zeolites decreased at higher pH due to the formation of OH radicals, which diminished the surface reactions, but enhanced the bulk removal of phenol. Large flow rates of ozonated air and ambient temperature were suitable for removal of both phenol and COD. A maximum of 50.5% phenol was removed by HZSM-5(80) at 100 ppm of phenol concentration. HZSM-5(80) removed both phenol and COD effectively compared to other zeolites at all operating conditions except when phenol concentration was higher at which H-USY was a better catalyst.