

## PYRITE AND MONOCHLOROPHENOL INTERACTIONS AT TRANSITION STATE

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Pyrite ( $\text{FeS}_2$ ) showed great promise as a starting material for decontamination of water polluted with organic pollutants both in the presence and absence of light. Thus, it can efficiently be used as a geo-catalyst in the destruction of both organic and inorganic pollutants. In this work, essential thermodynamic parameters of the activation state (entropy,  $\Delta S^\ddagger$ , enthalpy,  $\Delta H^\ddagger$ , and Gibbs free energy,  $\Delta G^\ddagger$ ) for phenol and other three monochlorophenol (MCP) isomer-pyrite complexes of 2-chlorophenol (2-CP), 3-chlorophenol (3-CP), and 4-chlorophenol (4-CP) were determined. The above systems were examined from rapid kinetic data obtained at different temperatures of 298, 308, and 318 K. Thermodynamic parameters of the activation/transition state were calculated by employing Arrhenius and Eyring models. Always  $\Delta S^\ddagger$  values are negative indicating that the activation state of MCP adsorption process is entropy-controlled. The adsorption isotherm data were fitted into the Langmuir model yielding monolayer coverages of  $5.353 \pm 0.377$ ,  $5.458 \pm 0.579$ , and  $7.058 \pm 0.603$  ( $\times 10^{-7}$ ,  $\text{mol m}^{-2}$ ) for 2-CP, 3-CP and 4-CP, respectively. In addition, Fourier Transform Infrared (FTIR) spectroscopic measurements were used to understand the nature of adsorbed complexes.