

Modification of pyrolised oil shale to increase of phenol adsorption capacity

Abstract:

This study focus the investigation of pyrolised oil shale modification to increase the capacity of adsorption of phenol. The organic matter of pyrolised oil shale, from the process PETROSIX® in São Mateus do Sul in Paraná - Brazil, was chemically activated by two cases, as activation of activated carbon: impregnation of oxidizing agents, followed of carbonization (400-500-600 °C) for 3 hours in nitrogen atmosphere. H₂SO₄ and HNO₃ were used for the first activation and H₃PO₄ for the second, as activants agents. The specific surface area, volume and pores size distribution were obtained by adsorption of nitrogen to 77 K, using the BET model. The FT-IR spectra, showed an increase in oxygenated groups before and after the carbonization, which could explain the increase in the capacity of adsorption in relation to the pyrolised oil shale without treatment. The equilibrium and kinetics studies of adsorption were performed using the bath method and loading were calculated from mass balances and was performed using the Freundlich and Sips models. To study the adsorption dynamics, tests were performed in microcolumn in fixed bed. The results showed a significant increase in the capacity of adsorption of phenol.