

Removal of Nitrogen containing compounds from fuel using modified activated carbon

ABSTRACT

This study was carried out to understand the suitability of activated carbon (AC) which is modified with hydrochloric acid (HCl) and tested by its adsorption capacity of nitrogen containing compounds (NCC) from fuel with three variables such as different concentrations of model fuel, contact time, and amount of modified AC (MAC). Batch mode experiments were conducted to remove quinoline (QUI) and indole (IND) from the model fuel prepared from n-hexane. All the experimental data were analysed using ultraviolet-visible spectroscopy after adsorption experiment between adsorbent and model fuel. Modification of commercial AC involved impregnation with different ratios of HCl solution. The characterization of modified and unmodified AC was done by using fourier-transform infrared spectroscopy (FTIR) and scanning electron microscope (SEM). The adsorption potential of the MAC was measured based on the two isotherms, which are Langmuir and Freundlich isotherms to determine the isotherm constants and two kinetic models which are pseudo-first order and pseudo-second order. The adsorption capacity for QUI and IND was found to be 0.4708 mg/g and 0.8094 mg/g, respectively. On the other hand, the rate of adsorption for QUI and IND was 6.3766 and 0.4992, respectively. The adsorption kinetic experiment for both QUI and IND was found to follow the pseudo first-order.