DIELECTRIC PROPERTIES AND ADSORPTIVE CHARACTERISTICS OF ZINC CHLORIDE TREATED PALM KERNEL SHELL

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ABSTRACT

Palm kernel shell (PKS) was used to prepare treated carbon by microwave irradiation using zinc chloride as the chemical agent. Present study aimed to evaluate the dielectric properties of PKS treated carbons at varying temperature and frequency and to investigate the adsorptive removal of methylene blue (MB). Treated carbons were prepared according to the impregnation ratios (ZnCl2: PKS) of 0:1 to 2:1, with microwave heating at 70% intensity. FTIR analysis shows that oxygen surface functional groups are present in all PKS treated carbons. For the evaluation of dielectric properties, the salt concentration effect showed similar trends for both with and without solid material. For the effect of salt concentration, dielectric constant decreased with increasing frequency and chemical ratio. For loss factor and tangent loss, they exhibit decreasing trend with increasing frequency and decreasing chemical ratio. As for the effect of salt solution temperature, dielectric constant decreased with increasing temperature and chemical ratio, while for loss factor and tangent loss, they increased with increasing temperature and chemical ratio. Moreover, the relaxation time and penetration depth decreased with increasing frequency and increased with increasing temperature. Lastly, the adsorptive removal of MB shows that the PKS treated carbon with 2:1 ratio had the maximum adsorption capacity at all concentration studied. In conclusion, PKS adsorbent prepared by microwave heating is largely dependent on the dielectric properties.
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