

Morphology and sorption kinetic studies of L-type activated carbons prepared from oil palm shells by ZnCl₂ and H₃PO₄ activation

Abstract

The aim of this investigation was to study the morphology and sorption kinetic studies of an L-type activated carbon prepared from Oil Palm Shells (OPS) by way of the two stage activation method in self-generated atmosphere using a muffle furnace. Both L-type dehydrating agents, zinc chloride and phosphoric acid were used as the chemical activation agent. For the ZnCl₂ samples, the optimum adsorption capacity was obtained when the samples were subjected to semi-carbonization of 400°C, 5 M ZnCl₂ impregnating solution, followed by pyrolysis at 400°C. Whereas for the H₃PO₄ samples, semi-carbonization of 400°C followed by 4.5 M H₃PO₄ impregnating solution and pyrolysis at 400°C has shown to produced the optimum adsorption capacity. All activated carbons were fitted well in the Langmuir adsorption isotherm and the pseudo-second-order kinetics. These results demonstrated that this agricultural waste has the potential to be converted into high-capacity adsorbent for the remediation of waste waters. © 2009 Asian Network for Scientific Information.