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.