

Manufacture of low-cost activated carbon using sago palm bark and date pits by physicochemical activation

ABSTRACT

Two raw materials, sago palm bark (SPB) and date pits, were utilized as precursors to prepare high porosity activated carbon (AC). The porosity of these two raw materials was compared with that of commercial AC made from coconut shells. The physicochemical activation method was used for AC preparation, and it consisted of two steps, carbonization and activation. The activation process was performed using zinc chloride ($ZnCl_2$) as an activation agent. N_2 adsorption-desorption analysis was carried out to characterize the porosity of AC. Thermogravimetric analysis (TGA) was conducted for the two raw materials. The adsorbent made from SPB, which showed the maximum surface area of $1634 \text{ m}^2/\text{g}$ at the $700 \text{ }^\circ\text{C}$ activation temperature for one hour, while the surface area of prepared AC from date pits was $1367 \text{ m}^2/\text{g}$. Both prepared ACs had a larger surface area than commercial AC made with coconut shell ($1348 \text{ m}^2/\text{g}$).

Keyword: Activated carbon; Date pits; Sago palm bark; Porosity characterization; Activation