

Nanocomposites and nanomaterials

Nanoporous activated material for the supercapacitors based on organic raw materials of plant origin

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Nanoporous carbon materials from organic raw materials of plant origin has a large area of the inner surface, a high electrical conductivity, a high stability parameters, and most importantly, that the raw materials are readily available and cheap.

In this work was obtained activated nanoporous carbon from raw materials of plant origin (corn stalks) by using various activating reagents. The process of making these materials consists of two phases: carbonization and activation.

Carbonization process was carried out at a temperature of 650°C. Feedstock was place in an evacuated retort and loaded in preheated tube furnace with operating temperature of 650°C for 60 minutes. After that, carbonated carbon was impregnated with a 30% aqueous solution of KOH. Then evacuated retort with the material placed in a heated tube furnace with operating temperature of 850°C and kept there for 40 minutes.

Fig.: Dependence specific capacity of carbon materials with different currents with KOH activator (1) and ZnCl₂ activator (2)

Similarly, the process of activation was conducted with ZnCl₂ activator.

After that, the experimental models of SC with one electrode weight of 20 mg and 30% aqueous KOH electrolyte solution were collected. The energy capacitive characteristics of received supercapacitors were investigated.

The received samples of nanoporous carbon material obtained from corn stalks with KOH and ZnCl₂ activation and with 30% aqueous KOH electrolyte indicates that the material can be used as electrode materials in supercapacitors.