

Synthesis of phloroglucinol-furfural carbon aerogel for electrochemical use

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Carbon aerogels, known to be very promising materials for electrodes in electrochemical double layer capacitors (EDLCs), are usually obtained by polycondensation of formaldehyde with a phenol derivative under basic conditions, followed by supercritical drying, and subsequent carbonization in an inert atmosphere. Resorcinol is the most common precursor used, and its aqueous polycondensation with formaldehyde under Na_2CO_3 basic catalysis gives a cross-linked polymeric gel (RF gel). However, because water in the aquogels is not suitable for supercritical drying, time consuming solvent exchange is required.

We easily and simply synthesized organic alcogel from the alcoholic sol-gel reaction of phloroglucinol and furfural (PFur) at room temperature. Various PFur carbon aerogels were synthesized according to various preparation conditions such as pH of solution, solvents, solvent ratio, aging time and carbonization temperature. Specific capacitance of PFur carbon aerogel measured by cyclic voltammetry is higher than that of other carbons. The surface and morphology of the PFur carbon aerogels were characterized by XPS and SEM.