CARBON MATERIALS FROM CONVENTIONAL/UNCONVENTIONAL TECHNOLOGIES FOR ELECTROCHEMICAL ENERGY STORAGE DEVICES

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ABSTRACT

In the last years our society has shown a growing interest on the development of both new sources of clean energy and advanced devices able to store it. In this context supercapacitors (SCs) and hybrid systems have emerged to cover the power and energy demands. Most of these electrochemical devices use carbon materials as electrodes being the activated carbons (ACs) the most commonly ones. Nonetheless graphene (G) has emerged as a promising electrode either by itself or combined with ACs in composites.

This work investigates the use of a low added value coal-derived liquid (anthracene oil, AO) for the production of pitch-like carbon precursors to synthesize suitable active electrode materials (ACs, G, AC/G) in SCs and hybrid systems. In addition to the well-known oxidative thermal polymerization of AO, a new alternative based on the use of microwave heating is presented as a promising clean route to obtain such carbon precursors resulting in energy saving, shortening time and specific non-thermal effects. The characteristics of the carbon materials obtained from both conventional/ unconventional technologies are compared mainly in terms of their specific surface area, surface chemistry and electrical conductivity which would allow the design of energy storage devices with an improved electrochemical performance.

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