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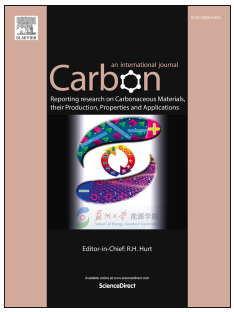

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Analysis of thermally induced changes in the structure of coal tar pitches by an advanced evaluation method of X-ray scattering data

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Abstract

Graphite materials generally contain considerable amounts of coal tar pitch binders initially consisting of small, randomly arranged stacks of graphene layers exhibiting structural disorder. Here, an advanced evaluation method for the analysis of Wide-Angle X-ray Scattering (WAXS) data of non-graphitic carbons, usually displaying broad and overlapping reflections, is used to systematically investigate the evolution of the carbon microstructure and, thus, the graphitizability of several coal tar pitches, permitting a quantification of the microstructural features on the nanometer scale. Although the investigated pitches exhibit distinctly different elemental and molecular compositions, the results revealed an almost identical development of the microstructure. For instance, the WAXS analysis proved a significant increase in the stacks size L_c and the graphene layer size L_a only at temperatures

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