

Preparation and characterization of mesophase pitches from petroleum residues using two-step low heat treatment

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Preparation of mesophase pitches requires high energy and time, which limit its application to various fields. In this study, to prepare mesophase pitches through low energy process, petroleum residues with AlCl_3 has been modified using two-step heat treatment which is heat treatment at 330 °C for 3~5 h after pre-treatment at 250 °C. To observe the mesophase in the prepared pitches, polarized optical microscopic analysis are is conducted. To analyze and characterize the physical properties and structure of the prepared pitches, elemental analyzer, Fourier-transform infrared spectrometer, softening point apparatus, X-ray diffractometer are used. The result of polarized optical microscope observation, mesophase is not observed in pitches carried out only pre-treatment. Whereas, mesophase contents are significantly increased from 10% to 100% by increasing secondary heat treatment time from 3 h to 5 h although the change of chemical structure and stacking height are slight. These results indicates that heat treatment time have influence on amount of crystallite.