

DEVELOPMENT OF SPINNABLE MESOPHASE PITCH USING ETHYLENE BOTTOM OIL WITHOUT HYDROGENATION

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Mesophase pitch has various uses as effective precursors for graphitic anode of Li-ion battery and high performance pitch-based carbon fiber. As a precursor of carbon fibers, its high price has been considered to be main obstacle to broad applications of mesophase pitch based carbon fiber. Spinnable mesophase pitch, which is used as a precursor for mesophase pitch based carbon fiber, is usually prepared from petroleum heavy oils and coal tar pitch through the purification, hydrogenation and other heat treatments with less than 10 wt. % pitch yield of its raw material. Hydrogenation lowers the softening point of the obtained mesophase pitch by introducing naphthenic structure and short-chain alkyl group (hydro and methyl group) to a raw material and coincidentally decreasing excess poly-aromaticity of heavy molecular components. However, it is considered as main reasons for decreasing the pitch yield and high price. For example, the spinnable mesophase pitch derived from FCC-DO prepared by hydrogenation and usual heat-treatment with nitrogen blowing usually showed the pitch yield of less than 5.0 wt. %. Therefore, the development of the spinnable mesophase pitch without hydrogenation is very required.

In this study, we have tried to prepare a spinnable mesophase pitch by controlled bromination-dehydrobromination and continuous N₂ blowing heat-treatment. The Bromination-dehydrobromination causes a reduction of alkyl groups and is also effective to conserve the light molecular components after heat-treatment. We investigated the effects of the addition of QI-free coal tar pitch (CTP) and FCC-DO to help the mesophase formation. In the presentation, we will show the results in detail.