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Production of Mesophase Pitch from Coal Tar and Petroleum Pitches using Supercritical Fluid Extraction

Mustafa Z. ÖZEL

Department of Chemistry, University of Pamukkale,

Denizli-TURKEY

Keith D. BARTLE

School of Chemistry, University of Leeds, Leeds, LS2 9JT, U.K.

 [Keywords](#)
 [Authors](#)



chem@tubitak.gov.tr

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Abstract: Supercritical fluid extraction (SFE) is currently being investigated as a possible technique in the production of high quality mesophase pitch from coal tar and petroleum pitches. Mesophase pitch is used to make high technology products, such as carbon fibre. The conventional production of mesophase pitch initially involves the removal of low molecular weight species from coal tar and petroleum pitches. The remaining residue is then transformed into a mesophase pitch through a polymerisation process. The aim of this study involves the extraction of light molecular weight species using SFE. Both petroleum and coal tar pitch contain complex aromatic molecules with an average molecular weight of 200 to 800, whereas mesophase pitch has a molecular weight range of about 1200 to 1300. Toluene, heptane, pentane and methanol were added to CO₂ as modifiers at temperatures between 80 and 200°C and at pressures of 200 to 400 atm. The effect of the temperature and pressure on extraction yield was found to be less than that of modifier addition and the results showed that the extraction yields were 19% and 33% from the petroleum and coal tar pitches respectively.

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