

**Structural change analysis of pyrolysis fuel oil with increasing heat treatment temperature using nuclear magnetic resonance**

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In the reforming process of pitch from PFO, various reactions such as distillation, cracking reaction, polymerization, and condensation occur. In order to investigate the structural change of PFO accompanied by these reactions, we made pitches and collected the volatile matters from PFO in different heat treatment temperature and performed <sup>1</sup>H-NMR based structural analysis. According to the analysis results, the amount of 1-2 ring aromatic compounds contained in PFO were gradually decreased as the heat treatment temperature increased up to 340 °C. At temperatures after 320 °C, the peaks for aliphatic hydrocarbon diminished with increasing temperature since aliphatic hydrocarbon sidechain were separated from aromatic compounds due to the cracking reaction. As a result, the structural change with the heat treatment of PFO is mostly affected by distillation effect up to 340 °C, and separation of aliphatic sidechain accompanied with cracking reaction occurs at the temperature after 320 °C.

**Key words:** Pyrolysis fuel oil, Volatile matters, Heavy oil fractions, Structural analysis, Nuclear magnetic resonance