

## 重质稠环芳烃的固体核磁共振光谱研究

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**摘要** 以固体核磁共振光谱为主要分析手段,比较研究了两种合成中间相沥青吡啶不溶组分的结构。结果表明:均四甲基中间相沥青吡啶不溶组分具有较低的芳香度和缩合度,富含甲基和环烷结构,分子呈渺位结合实际构型;与此相反,四氢萘基中间相沥青则呈现很高的芳香度和缩合度,芳环上仅带有一些甲基取代基,平均分子为完全迫位缩合构型,造成这种结构差异的原因在于前驱齐聚物的结构及缩聚程度的不同。

**关键词** [重质烃](#) [核磁共振](#) [中间相](#) [沥青](#) [构型](#) [芳香烃](#) [稠环化合物](#) [核磁共振](#)

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## Structural studies of highly-condensed polyaromatics by solid state NMR

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**Abstract** Two mesophase pitches with  $\Phi=1$  anisotropic content and excellent spinnability were synthesized from two types of pure aromatics, i.e., 1,2,4,5-tetramethylbenzene (durene, Du) and tetralin (Te) by methylene-bridge cross-linking reaction and subsequent heat-treatment. In our research, the structural features of pyridine insoluble fractions (PI) of these two synthetic mesophase pitches were comparatively investigated by solid state nuclear magnetic resonance (NMR). It is shown that the PI fraction from Du based mesophase pitch contains abundant methyls and some amount of naphthenic groups and exhibits lower aromaticity and condensation degree. The molecules in mesophase pitch appear to have kata-type aromatic skeleton. Nevertheless, the PI fraction from Te mesophase pitch contains only methyl groups, exhibiting very high aromaticity and condensation degree. The molecules in mesophase pitch appear to have peri-type aromatic skeleton. The following factors should account for the differences between the two PI fractions of synthetic mesophase pitches: the structures of oligomers and the condensation variables.

**Key words** [HEAVY HYDROCARBON](#) [NUCLEAR MAGNETIC RESONANCE](#) [MESOPHASE](#) [BITUMEN](#) [CONFIGURATION](#) [AROMATIC HYDROCARBON](#) [FUSED RING COMPOUNDS](#) [NUCLEAR MAGNETIC RESONANCE](#)

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