Phenolic Resins: Synthesis, Modifications, Properties, and Applications

Graphitization of phenolic resin

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This book chapter explores the transformative process of graphitization applied to phenolic resin (PR), resolving the drive from a resourceful polymer to carbonaceous materials with graphite-like properties. Beginning with an overview of the significance of graphitic materials, the chapter presents the motivation behind graphitizing PR. Essential properties, chemical structure, and composition of PR are outlined. The carbonization phase is examined, with a focus on key factors such as temperature, atmosphere, and resulting structural changes. The principles of graphitization, encompassing temperature, heating rate, and inert atmosphere, are explored in depth, providing a foundational understanding of this intricate process. The experimental techniques and setup for PR graphitization are elucidated. Factors influencing the resulting graphitic material properties, including catalysts and additives, are discussed, while these materials' applications in diverse niches underscore the significance of graphitized PR. Challenges in the graphitization process are addressed, and future perspectives and emerging trends are considered, offering a glimpse into potential advancements. The chapter concludes by summarizing key points, reaffirming the profound implications of graphitization on PR, and inspiring further exploration in this dynamic field.