

Unveiling the Synthesis Mechanisms of Carbon Nitride and its Derivatives

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June 10, 2023

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Submitted to

Daniel Smith

Editorial Assistant

Journal of Materials Chemistry A, B & C

Royal Society of Chemistry

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Abstract

Carbon nitride (C-N) and its derivatives have attracted significant attention in materials science due to their intriguing properties and wide application potential. The primary objective is to provide a comprehensive and detailed overview of the synthesis and mechanism of carbon nitride and its derivatives. The existing gap in the literature is brought out by focusing on the synthesis mechanisms and the impact of various synthesis parameters, which have been possibly overlooked in reported literature, while the literature predominantly emphasized characterization and application aspects. By bridging this knowledge gap, this presentation aims to offer researchers and scientists an understanding of the synthesis and mechanism of carbon nitride and its derivatives. The intricacies of different synthesis approaches, including chemical vapor deposition, thermal methods, and template-assisted strategies, will be covered. Each method's advantages, limitations, and potential in producing tailored carbon nitride materials through critical analysis will be highlighted. Moreover, the significance of synthesis conditions such as precursor composition, temperature, pressure, and reaction time will be covered. These parameters determine carbon nitride derivatives' structural, morphological, and optical properties. By unraveling the key factors influencing the synthesis process, the aim is to empower researchers to design and optimize synthesis routes to obtain carbon nitride materials with specific and desired properties. These insights gained from this presentation will contribute to the advancement of materials chemistry and inspire the development of innovative synthesis strategies. Ultimately, this will drive the exploration of new carbon nitride materials for various applications.