

## عنوان مقاله:

Recent Developments in Synthesize, Properties, Characterization, and Application of Phthalocyanine and Metal Phthalocyanine

## محل انتشار:

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## خلاصه مقاله:

Phthalocyanines (Pcs) are macrocyclic chemical compounds that have attracted a lot of attention in the last decade due to their varied properties. Over time, the extensive utilization of PCs has been justified due to their exceptional nature, with their numerous desirable qualities stemming from the straightforward and adaptable methods for altering their structure. These modifications have enabled a wide range of applications, including photodynamic therapy for cancer treatment, chemical sensing, solar cells, nonlinear optics, and, most recently, photoinitiator systems for various polymerization processes, including free radical, cationic, and controlled radical polymerizations. Pcs distinctive electrochemical, photochemical, and photophysical properties have made all of these advancements possible. Our motivation to emphasize the significance of phthalocyanines in chemical science is driven by their remarkable success story. This study commences with an exploration of the design and synthesis of Pcs tailored for specific applications, followed by a spotlight on innovative research that harnesses the diverse activation capabilities of these .macrocycles to initiate various types and also describes characterization

## کلمات کلیدی:

Phthalocyanines, Properties, Syntheses, Variety applications, Characterization, Photodynamic therapy

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