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# 碳负载量子点复合材料的制备

## Preparation of carbon-loaded quantum dot composites

### 摘 要

碳元素在自然界是非常独特的一种元素，碳原子之间和碳原子与其它原子之间通常通过各式各样的成键方式来形成各种不同的形态，因此形成的物质其结构和特性各有不同，直至今日研究者们对碳材料的研究很是极为关注，自从碳纳米材料被发现、研究，其性能特点及应用领域就及其吸引人，纳米多孔碳材料的孔道均匀，结构稳定，以此做为载体材料制备更多功能特性的物质应用前景很大。本实验就是用纳米多孔碳作为载体负载量子点，以此研究是否能更好的发挥量子点的特性及应用更多的领域。

碳量子点是一种碳基零维材料，据近几年研究表明碳量子点具有良好的水溶性、环境友好型、优秀的光学性质、无毒性、成本低来源广等特性，其最为突出的特性就是光致发光，有良好的应用前景，但是碳量子点是 10nm 一下大小的类球状碳颗粒，可作为负载材料，因此用纳米多孔碳（或其他材料）负载量子点制成的复合材料有很大的研究意义。本实验着重研究碳负载量子点复合材料的性能和特性。

本文为探究量子点及纳米多孔碳的性能，制备了碳负载量子点复合材料，并对其结构做了具体的表征，包括 FTIR、XRD、BET、TEM 等。通过碳负载量子点复合材料光催化降解甲基橙实验的研究，认为碳负载量子点复合材料有良好的催化降解效果，其降解率最高可达：0.8099，可以重复使用次，降解率保持不变。

**关键词：**碳量子点 纳米多孔碳 光催化 红外光谱 甲基橙降解

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## Abstract

Carbon is one of the most unique elements in nature. Carbon atoms and other atoms usually form various forms by means of various bonding methods. Therefore, the substances formed have their structures and characteristics. Different, until today, researchers are very concerned about the study of carbon materials. Since carbon nanomaterials have been discovered and studied, their performance characteristics and application fields are attractive. The pores of nanoporous carbon materials are uniform and structurally stable. This is a promising application for the preparation of more functional properties of the carrier material. In this experiment, nanoporous carbon is used as a carrier to support quantum dots, so as to study whether the characteristics of quantum dots can be better utilized and more fields are applied.

Carbon quantum dots are carbon-based zero-dimensional materials. According to recent studies, carbon quantum dots have the characteristics of good water solubility, environmental friendliness, excellent optical properties, non-toxicity, low cost and wide source. The characteristic is photoluminescence, which has a good application prospect, but the carbon quantum dot is a spherical carbon particle of a size of 10 nm, which can be used as a load material, so a composite material made of nanoporous carbon (or other material) loaded quantum dots has Great research significance. This experiment focuses on the performance and characteristics of carbon-loaded quantum dot composites.

In order to explore the properties of quantum dots and nanoporous carbon, carbon-loaded quantum dot composites were prepared and their structures were characterized, including FTIR, XRD, BET, and TEM. The photocatalytic degradation of methyl orange by carbon-loaded quantum dot composites shows that the carbon-loaded quantum dot composites have good catalytic degradation, and the degradation rate is up to: 0.8099 . it can be reused and the degradation rate remains unchanged.

**Key words:** Carbon quantum dot NPC Photocatalytic IR Methyl orange degradation

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