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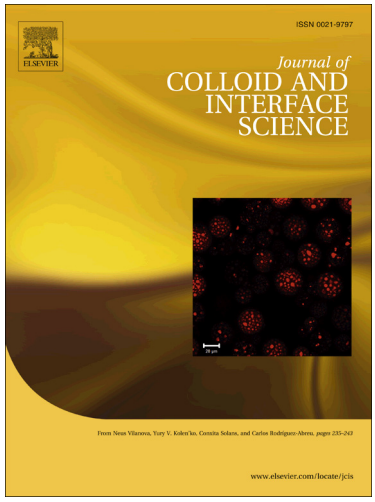

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Photochemistry of nanoporous carbons: perspectives in energy conversion and environmental remediation

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Abstract

The interest in the use of nanoporous carbon materials in applications related to energy conversion and storage, either as catalysts or additives, has grown over recent decades in various disciplines. Since the early studies reporting the benefits of the use of nanoporous carbons as inert supports of semiconductors and as electron acceptors that enhance the splitting of the photogenerated excitons, many researchers have investigated the key role of carbon matrices coupled to all types of photoactive materials. More recently, our group has demonstrated the ability of semiconductor-free nanoporous carbons to convert the absorbed photons into chemical reactions (i.e. oxidation of pollutants, water splitting, reduction of surface groups) opening new opportunities beyond conventional applications in light energy conversion. The aim of this paper is to review the recent progress on the application of nanoporous carbons in photochemistry using varied illumination conditions (UV, simulated solar light) and covering their role as additives to semiconductors as well as their use as photocatalysts in various fields, describing the photochemical quantum yield of nanoporous carbons for different reactions, and discussing the mechanisms postulated for the carbon/light interactions in confined pore spaces.

Keywords: Nanoporous carbons; photochemistry; heterogeneous photocatalysis; carbon/light interactions; energy conversion.

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