AOTs-18

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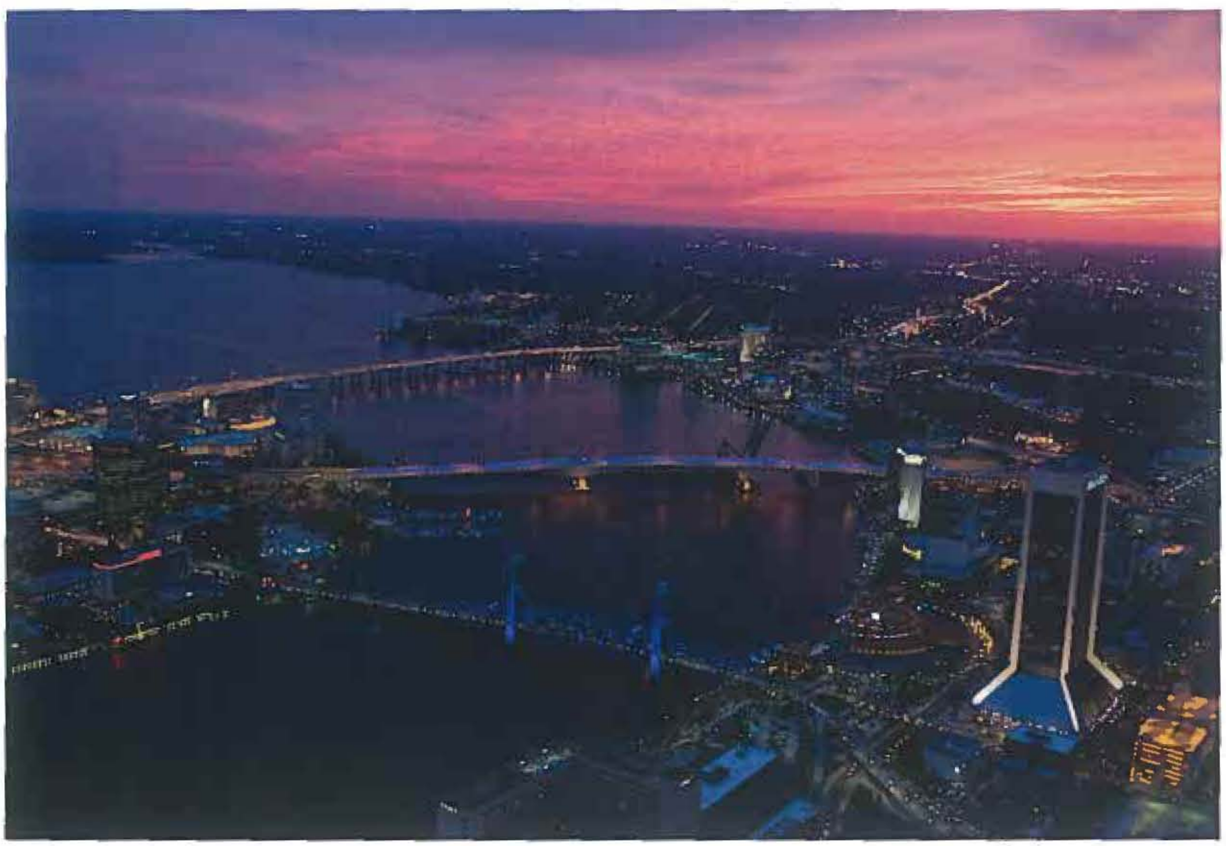
ABSTRACTS



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Carbon-Based Materials as Catalysts in Advanced Oxidation Processes for Water Treatment

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Limited access to clean water is one of the major problems afflicting mankind. Water scarcity is an immediate consequence of population growth, agricultural and industrial expansion, and is on the verge of a critical point in several zones of the globe. This calls for the research and development of new efficient water purification technologies, preferably of low cost and low energy consumption, as well as minimizing the use of chemicals and their impact on the environment.

Nanocarbon materials, such as graphene oxide (GO) and carbon nanotubes (CNT), offer the benefit of their special structural and electronic properties to develop effective catalysts for advanced oxidation technologies (AOTs), such as photocatalysis and catalytic wet peroxide oxidation (CWPO). In particular, graphene, the two-dimensional carbon allotrope consisting of a single atomic layer honeycomb network of sp^2-hybridization, was experimentally sought long before [1] its pioneering isolation and identification in 2004 [2]. This material is considered the thinnest in the world and the strongest ever measured [3], that together with other unique physical properties rendered it as one of the most exciting and challenging materials for both fundamental science and future technological applications.

In the present work, GO and CNT were used as catalysts on their own, or combined with metal oxides to prepare carbon-based composites. The materials were characterized by several experimental techniques (AFM, TPD, TGA/DSC, SEM, XRD, N_2 adsorption, Raman spectroscopy, among others) and used as catalysts in the form of powders, films and membranes for the degradation and mineralization of hazardous pharmaceutical and azo dye pollutants by using photocatalysis and CWPO processes.

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