

CIGARETTE BUTT-BASED POROUS MATERIALS FOR ADSORPTION/PHOTOCATALYSIS OF AQUATIC POLLUTANTS

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Cigarette butts are one of the most widespread solid wastes produced worldwide since trillions of cigarette butts are disposed annually inadequately, posing a serious pollution hazard to the environment. The potential of the non-biodegradable filter, main component of cigarette waste, can be explored as raw material for porous materials development, taking advantage of the filters composition, and of the entrapped tobacco additives.

The release and detection of pharmaceutically active ingredients in the aquatic environment has raised a special apprehension among the scientific community due to the potential negative effects on human and aquatic organisms health. The use of porous materials for their removal/degradation has become a well-established solution.

The aim of this work was to explore the use of cigarette butts as raw material for the production of chars and membranes, providing a viable disposal solution for cigarette butts and to elucidate the materials potential for adsorption/degradation of selected pharmaceuticals commonly detected in the aquatic environment.

Different experimental parameters (preparation, pyrolysis conditions) resulted in chars with different morphological, textural and chemical properties, and with apparent surface areas up to 530 m²g⁻¹. Asymmetric membranes were synthesized *via* phase inversion methodology, under different experimental conditions (pore forming agent, weight ratio of pore forming agent:filters, plasticizer volume). Tobacco additives led to less porous samples and with acidic surface. Pre and post-impregnation of the filters/chars/membranes with SiO₂ and Fe₃O₄, was performed and selected samples were tested as adsorbents for the removal of pharmaceuticals from aqueous solutions, and as photocatalysts for the degradation of those compounds.