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GLYCEROL-BASED CARBON MATERIALS FOR THE CATALYTIC WET PEROXIDE OXIDATION PROCESS

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It is known that metal-free carbon materials can act as catalysts for the catalytic wet peroxide oxidation (CWPO) process to treat organic pollutants in aqueous solutions [1]. On the other hand, crude glycerol, such as resulting from biodiesel production, is being offered as an abundant and low cost feedstock [2]. In the present work, glycerol-based carbon materials (GBCMs) with distinct properties were produced and tested as catalysts for CWPO, using 2-nitrophenol (2-NP) as a non-biodegradable model pollutant.

GBCMs were prepared adapting the procedure described elsewhere [3], which involves the *in situ* partial carbonization and sulfonation of glycerol (10 g) with concentrated sulphuric acid (40 g) at 180°C. The resulting material (particle sizes 0.106-0.250 mm) was then calcined under a N_2 flow at 800°C. The so obtained GBCM was thermally activated in air flow at 200°C, 300°C and 350°C, producing several distinct materials ($GBCM_{200}$, $GBCM_{300}$ and $GBCM_{350}$, respectively). The experiments were performed in a glass reactor, loaded with a 2-NP solution (100 mg L^{-1}), at T = 50°C, pH = 3, load of GBCM = 1.0 g L^{-1} and, in CWPO runs, $[H_2O_2]$ = 34.6 mmol L^{-1}. As observed in Figure 1, the thermal treatment in air atmosphere increases the activity, with more pronounced results to $GBCM_{300}$. Thus, it can be concluded that glycerol-based active catalysts for the CWPO process can be produced, opening a window of opportunity for value-added crude glycerol materials.

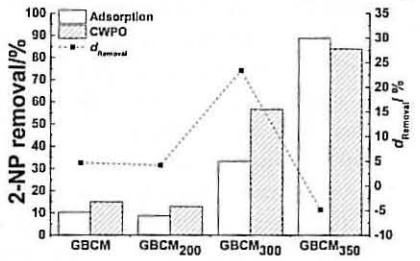

Figure 1. 2-NP removal in adsorption and CWPO runs after 120 min (bars/left axis), and respective difference due to H_2O_2 addition [$d_{Removal}$ (squares/right axis)].

Acknowledgements

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