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**THE BOOK OF ABSTRACTS**

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## CARBON CRYOGEL MAGNETITE COMPOSITES-EFFECTIVE ADSORBENTS FOR THE PHOSPHATE AND PHENOL REMOVAL FROM WATER

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### ABSTRACT

Carbon cryogel (CC) was impregnated with magnetite to produce a multifunctional magnetic adsorbent capable of removing phenoles and phosphates from water. Adsorbents were prepared via co-precipitation of  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$  ions in aqueous solution in the presence of CC. Non-treated or acid-activated CC was used. The CC:  $\text{Fe}_3\text{O}_4$  ratios of 1:1 and 3:1 were applied. The addition of HCl in the synthesis process was also investigated. XRD confirmed the formation of nanocrystalline magnetite. BET analysis showed that the pre-treatment diminished the CC porous structure, reducing also specific surface area ( $S_p$ ). Formation of magnetite decreases  $S_p$  and total volume of micro and meso pores, but their distribution remained unchanged. FTIR spectra revealed that magnetite was attached to the surface of the acid activated CC via C=O bond. DTA-TGA and SEM indicated that acid treatment and presence of HCl were beneficial for homogeneous nucleation and distribution of magnetite, increasing adsorption properties of composite. Batch adsorption proved that the maximum adsorption capacity for phenoles was accomplished with 3:1 ratio with non-treated CC. Samples synthesized with pre-treated CC, under 1:1 ratio, gave the best results for phosphate removal. The CC/magnetite composite was found as promising adsorbent for the simultaneous removal of both pollutants.

**Keywords:** carbon cryogel, magnetite, synthesis, adsorption, pollutants.

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