Preparation of a Hierachical Porous ZIF-8@GO Structure by Supercritical CO_2

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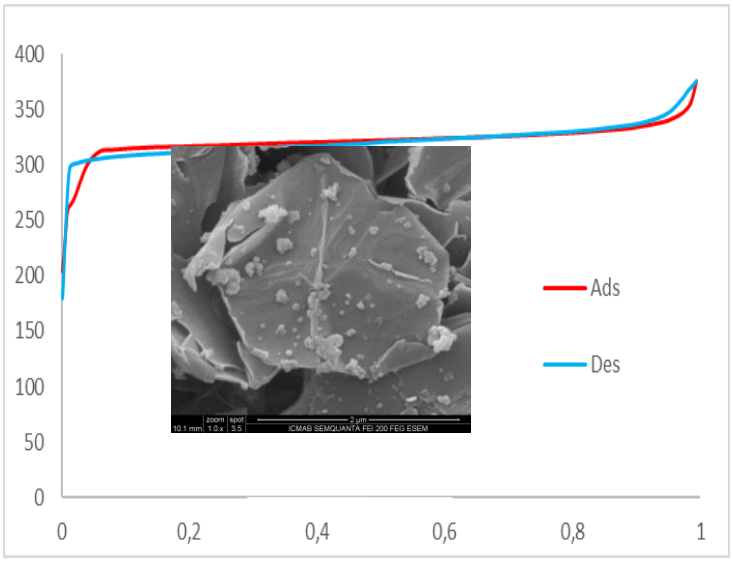
This work is focused on the preparation of a Zeolitic Metal-Organic Framework ZIF-8@Graphene Oxide (GO) hybrid aerogel by a straightforward one-pot synthesis in supercritical CO_2. This composite is structured as a hierarchical porous system formed by the mesoporous GO and the microporous ZIF-8 MOF. ZIF-8 is an already well-known microporous material, easily synthesized, even in supercritical CO_2 [1]. Its relatively cheap precursors coupled with a high specific surface area makes this MOF a perfect candidate to be combined with a mesoporous structural material such as GO for adsorption applications. GO is a carbon-based material formed by heavily functionalized 2D flakes, with a great potential as a matrix material. In the present work, GO flakes have been used as the backbone for the formation of an aerogel [2,3], which is capable of holding MOF crystals anchored to its platelets. The hybrid composites formed in this work present a typical GO aerogel monolithic structure (Fig. 1). The SEM images (Fig. 2) demonstrate that crystals grew on top of the GO platelets, which is a key point in the generation of a hierarchical structure. Solid state characterization techniques, such as N_2 adsorption and X-ray diffraction are used to further asses the properties of this material. The characteristics of the obtained hybrid compounds encourage several potential applications in the field of gas adsorption/separation and catalysis. Finally, this hierarchical system helps to solve the diffusion drawbacks often found in microporous structures.



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[3] Patent: PCT.ES201907/0082