Synthesis of a new Covalent Organic Framework (RIO-1)

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Introduction

Microporous materials are important for a variety of applications such as catalysis, adsorption, etc. Zeolites are the materials most commonly found in this class. Recently, however, have been proposed new materials containing inorganic and organic part of, called Metalorganic Framewoks, *MOFs*. This coordination polymers proposed by Yaghi et al[1-3] present a wide range of applications and are easily modified structurally to meet various technological demands. However, these are relatively susceptible to structural collapse if exposed to hard reaction conditions (temperature, presence of water vapor etc). An alternative to these are completely organic porous materials, the Covalent Organic Frameworks (COFs). This class of materials has been proposed very recently and still is in early stages of development. This way, our group has been investing in the development of new COFs and applications using these nanomaterials. In this paper, we present a new COF based on a triangular building block and a tetrahedral.

Results and Discution

A new organic porous material of the family of COFS (Covalent Organic Frameworks) was synthesized. The material, called RIO-1 (Reticular Interlab Organic Framework), has a new proposal for the material building block, which are the tetrakis (4-aminobenzene) methane and triphormiltripluoroglucinol[4] (Figure 1). These building blocks were linked via imine formation reaction in dioxane medium, 3M HOAc at 120°C for 3 days. A three-dimensional microporous structure with an area of 1370 m^2 / g (BET, N_2) is obtained. The pore size, as determined by analysis of the isotherm showed the presence of pores 12 and 17 Angstroms. However, XRD showed amorphous system and SEM showed that the material has spherical morphology, consistent with the amorphous profile.

The material is stable up to 400°C (TGA) and may serve as a frame for the development of a lot of catalysts and adsorbent materials, which are presently being explored.

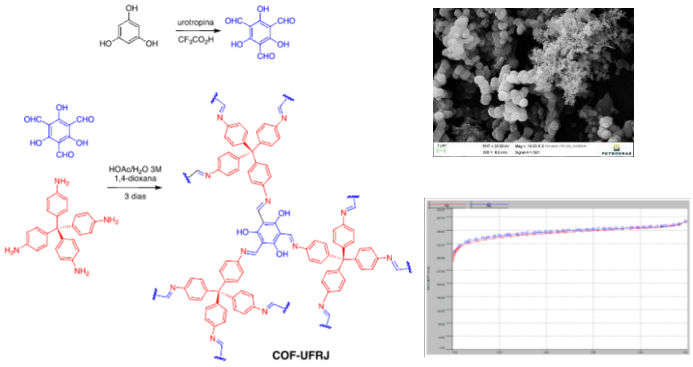

Figure 1. Synthesis of RIO-1. Right, SEM (above) and isotherm (below).

Conclusions

The organic micro porous material RIO-1 was successfully synthesized. Its synthesis proved reproducible and high specific area.

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