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# Resistant, stable HKUST@MC composite for highly-efficient gas adsorptive desulfurization

**Flávia H. Silva[1], Leonã S. Flores[1], Aline F. M. da Silva[2], Célia M. Ronconi[2], Alexandre A. Leitão[1], Charlane C. Corrêa[1]**

*[1]Department of Chemistry, Federal University of Juiz de Fora (UFJF), Juiz de Fora, MG, Brazil.*
*[2]Department of Inorganic Chemistry, Fluminense Federal University (UFF), Chemistry Institute, Niterói, RJ, Brazil.*
*E-mail: flaviaheredia@ice.ufjf.br*

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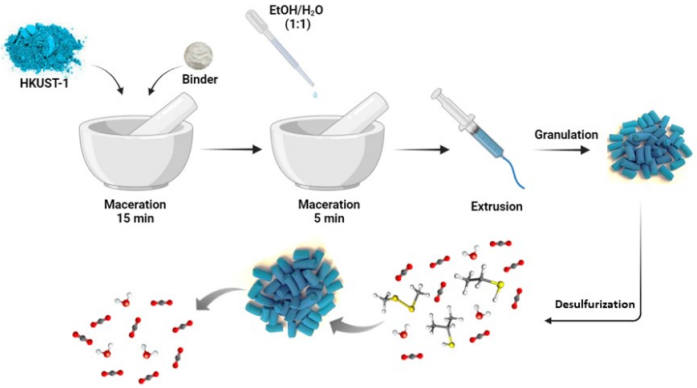
HKUST-1 is a well-known copper-based metal-organic framework, promising to be used in the separation process, however their industrial usage remains confined due to the difficult handling and low mechanical stability when in a powder form. In this work, we have synthesized and analyzed mechanical properties of novel HKUST-1 shaped composites based on methylcellulose and poly(vinyl formal, using a simple and inexpensive extrusion technique. The composites were characterized by different techniques, such as Fourier transform infrared spectroscopy and powder X-ray diffraction analysis. The composite with methyl cellulose showed good mechanical resistance, with an average crushing strength value of 40 N. Nitrogen sorption measurement showed that the specific surface area reduction due to the shaping process for HKUST@MC was only 8.6 %. The greater hydrolytic stability after heat activation of HKUST@MC compared to pure MOF was also verified. The adsorptive capacity of HKUST@MC towards organosulfur compounds found in sour gas was evaluated in a desulfurization test using a realistic multicomponent gas mixture. HKUST@MC exhibiting a high efficiency to adsorb organosulfur, outperformed the benchmark sulfur adsorbent Norit RGM 3 in the adsorption of ethanethiol and dimethyl disulfide.

Figure 1. Scheme of shaping process of HKUST-1 for adsorption desulfurization.

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