

A series of sulphonic acid functionalized mixed-linker DUT-4 analogues: synthesis, gas sorption properties and catalytic activity

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Metal-Organic Frameworks (MOFs) are a class of highly crystalline porous materials that are constructed by metal ions or clusters coordinated to multidentate organic ligands.¹ The functionalization of such solids can be achieved either by employing pre-functionalized linkers or by post-synthetic modification, and the number of the functional groups in MOFs can be adjusted by varying the ratio of functionalized and unfunctionalized linker molecules, which will greatly affect their gas sorption behaviour, catalytic performance as well as their thermal and chemical stability. In this contribution, we present the incorporation of different ratios of sulphonic acid ($-\text{SO}_3\text{H}$) functional groups into the well-known DUT-4 structure². Hereafter the gas sorption properties of the resulting materials were examined demonstrating that the SO_3H groups have a significant impact on changing the gas sorption capacities. Moreover, the functionalized DUT-4 materials were studied as catalysts in the acid catalyzed ring-opening reaction of different epoxides using rather mild reaction conditions and low catalyst loadings. The DUT-4- SO_3H framework exhibited a good catalytic efficiency and a good recyclability. Nearly full conversion was reached after 24 hours of reaction time. Furthermore, the catalyst could be reused for several runs without a significant reduce in the catalytic performance and maintained its structural stability.

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2. I. Senkowska, F. Hoffmann, M. Fröba, J. Getzschmann, W. Böhlmann and S. Kaskel, *Microporous and Mesoporous Materials*, 2009, **122**, 93-98.

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