

# Synthesis of a hybrid MIL-101(Cr)/ZTC composite for hydrogen storage applications

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## Abstract

Metal–organic frameworks (MOFs) hybrid composites have recently attracted considerable attention in hydrogen storage applications. In this study a hybrid composite of zeolite templated carbon (ZTC) and Cr-based MOF (MIL-101) was synthesised by adding the templated carbon in situ during the synthesis of MIL-101(Cr). The obtained sample was fully characterized and hydrogen adsorption measurements performed at 77 K up to 1 bar. The results showed that the surface areas and the hydrogen uptake capacities of individual MIL-101 (2552 m<sup>2</sup> g<sup>-1</sup>, 1.91 wt%) and zeolite templated carbon (2577 m<sup>2</sup> g<sup>-1</sup>, 2.39 wt%) could be enhanced when a hybrid MIL-101(Cr)/ZTC composite (2957 m<sup>2</sup> g<sup>-1</sup>, 2.55 wt%) was synthesized. The procedure presents a simple way for enhancement of hydrogen uptake capacity of the individual Cr-MOF and templated carbon samples.