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Synthesis and characterization of functionalized cerium and zirconium metal- organic frameworks as novel solid acid catalysts for hydrogen generation

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**Supplementary Information**



**Fig. S1: FT-IR spectra obtained for the indicated pure** **(a) MOF-III, (b) MOF-I, and (c) MOF-II .The spectra obtained for the corresponding 15 wt% acid-functionalized MOFs and the pure phthalic (BDC) and amino phthalic (NH2-BDC) acids are shown in the inset for comparison**.



**Fig. S2: Survey (a) and HR-XPS (b-f) spectra obtained for 15ADHP/MOF-II.**

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**Fig. S3: Survey (a) and HR-XPS (b-f) spectra obtained for 15PMA/MOF-II.**

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**Fig. S4: histograms representing the effect of the additive loading level (5-15 wt%) on the reaction time up to V75 of hydrogen generated on each of the indicated functionalized MOFs.**



**Fig. S5: VH2-t plots obtained to test the influence of the reaction temperature (30-45 oC) in the presence of the indicated pure and AS-functionalized MOFs under the following invariant reaction conditions: 50 mL of NaBH4 solution of 0.05 M; and catalyst mass (0.05 g).**