Electronic Supplementary Material (ESI) for CrystEngComm.

High-silica hollow Y zeolite obtained by selective desilication of dealuminated NaY crystals in the presence of protective Al species

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Supplementary Information

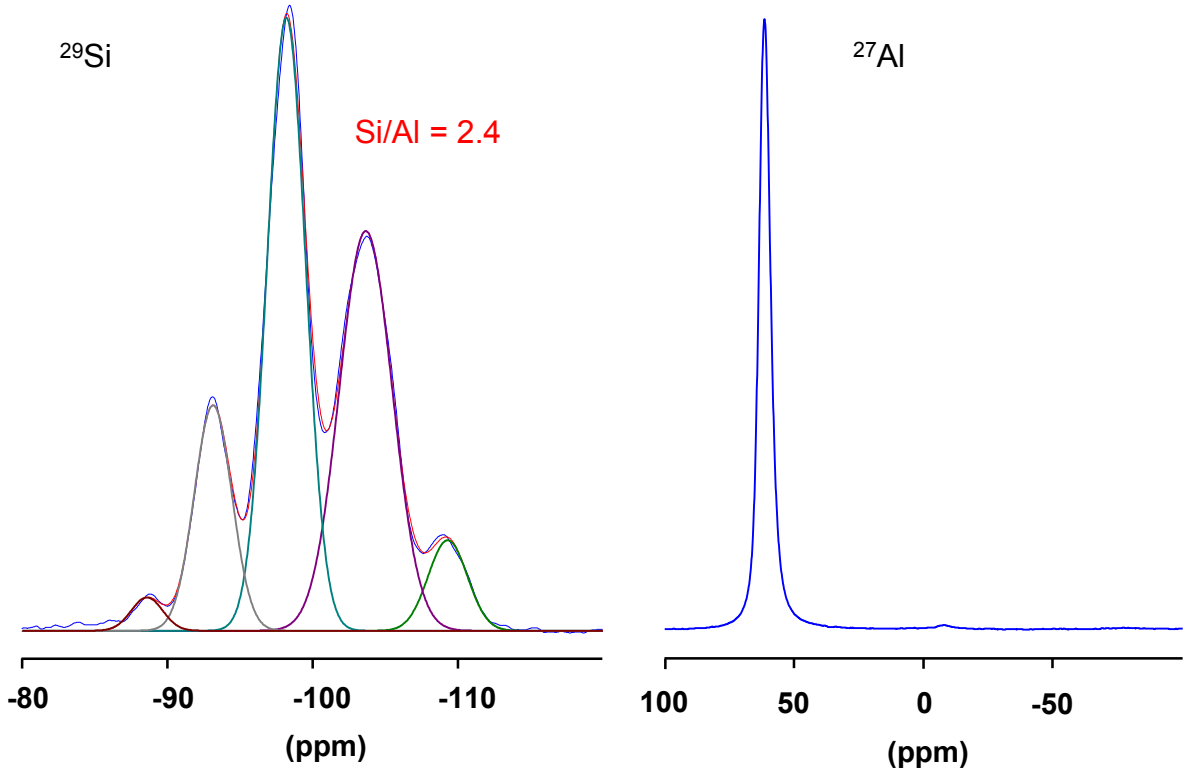

Figure S1 ^{29}Si (left) and ^{27}Al (right) NMR spectra of as-made NaY zeolite. The deconvolution of the ^{29}Si NMR spectrum using 5 components corresponding to $Si(OAl)_n(OSi)_{4-n}$ environments ($0 \leq n \leq 4$) gives a framework atomic ratio Si/Al = 2.4

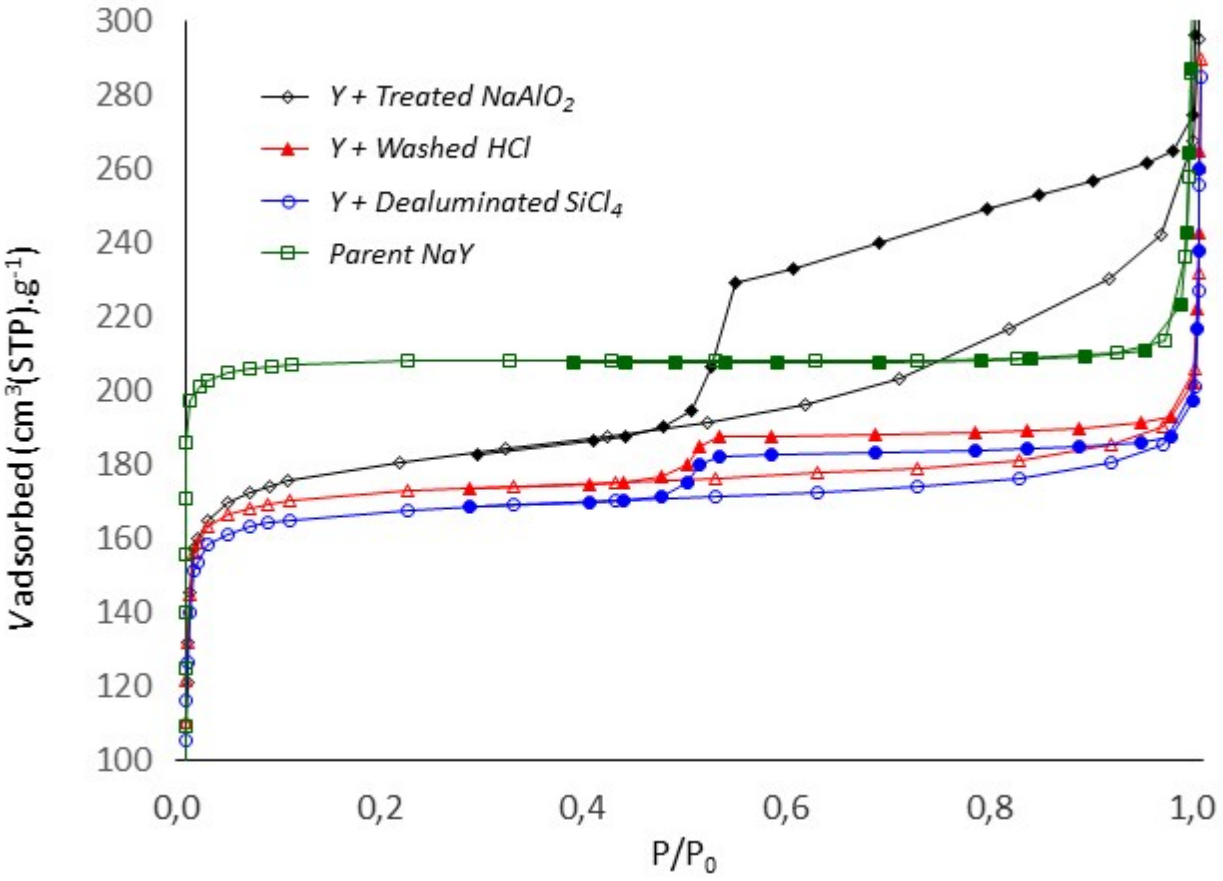

Figure S2 N_2 adsorption (open symbols)/desorption (filled symbols) isotherms of the various zeolites.

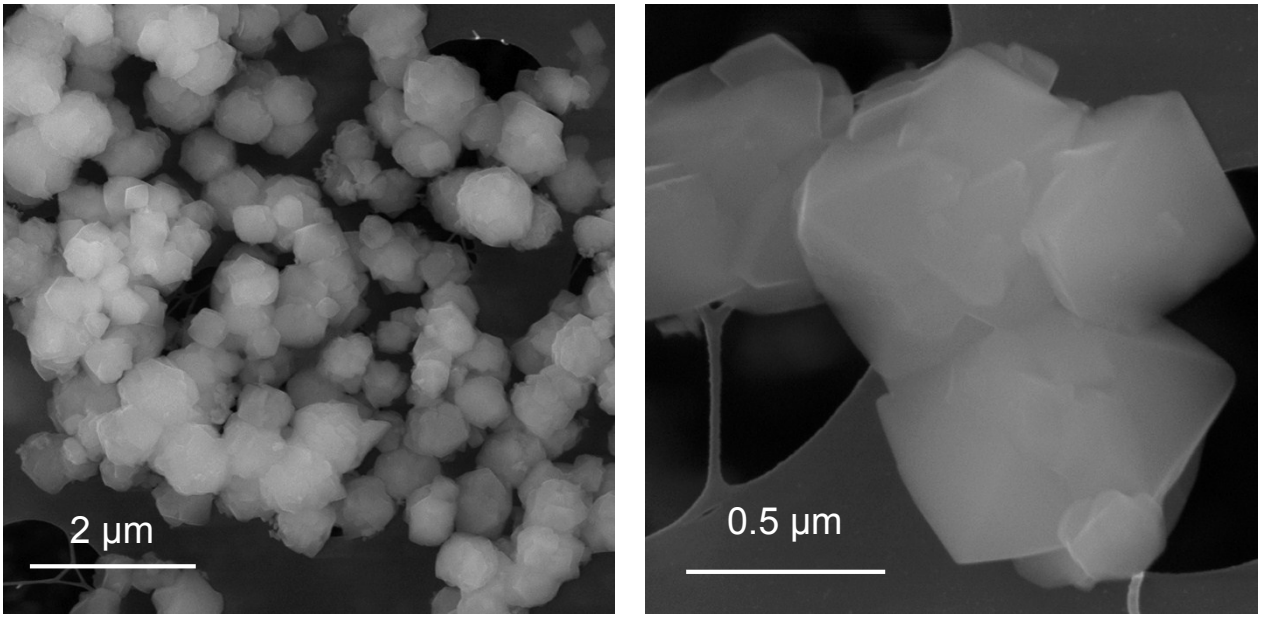

Figure S3 SEM pictures of parent NaY zeolite after dealumination with $SiCl_4$

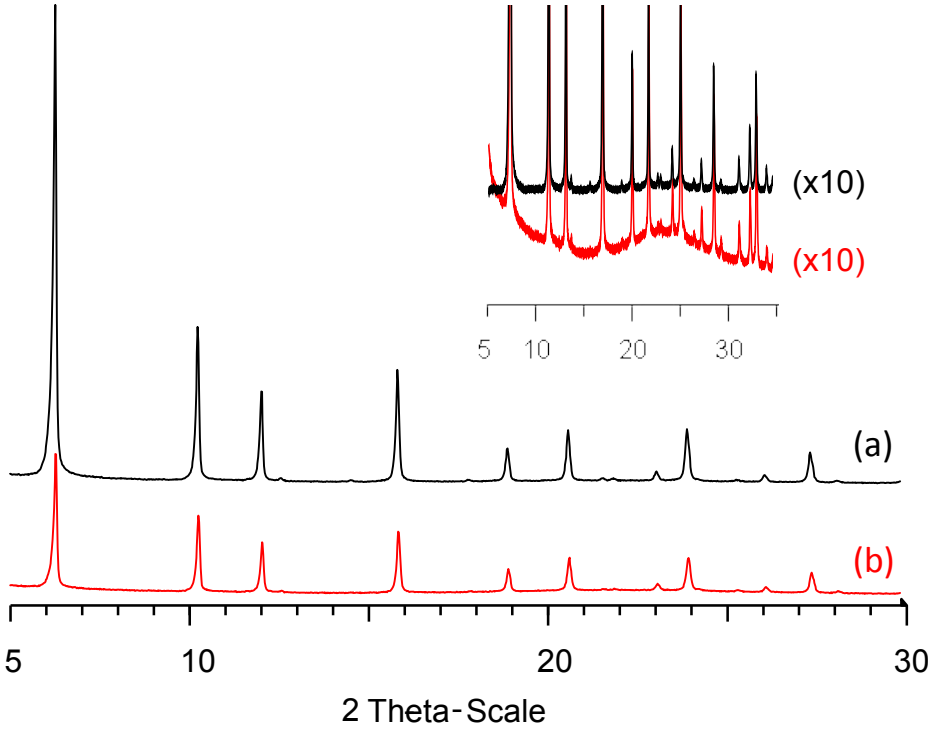

Figure S4 Quantitative comparison of XRD patterns of hollow crystals obtained following the standard 3-steps process (a) and using NaOH instead of $NaAlO_2$ in the desilication process. (b). The inset clearly evidences the presence of amorphous matter in the solid desilicated with NaOH.

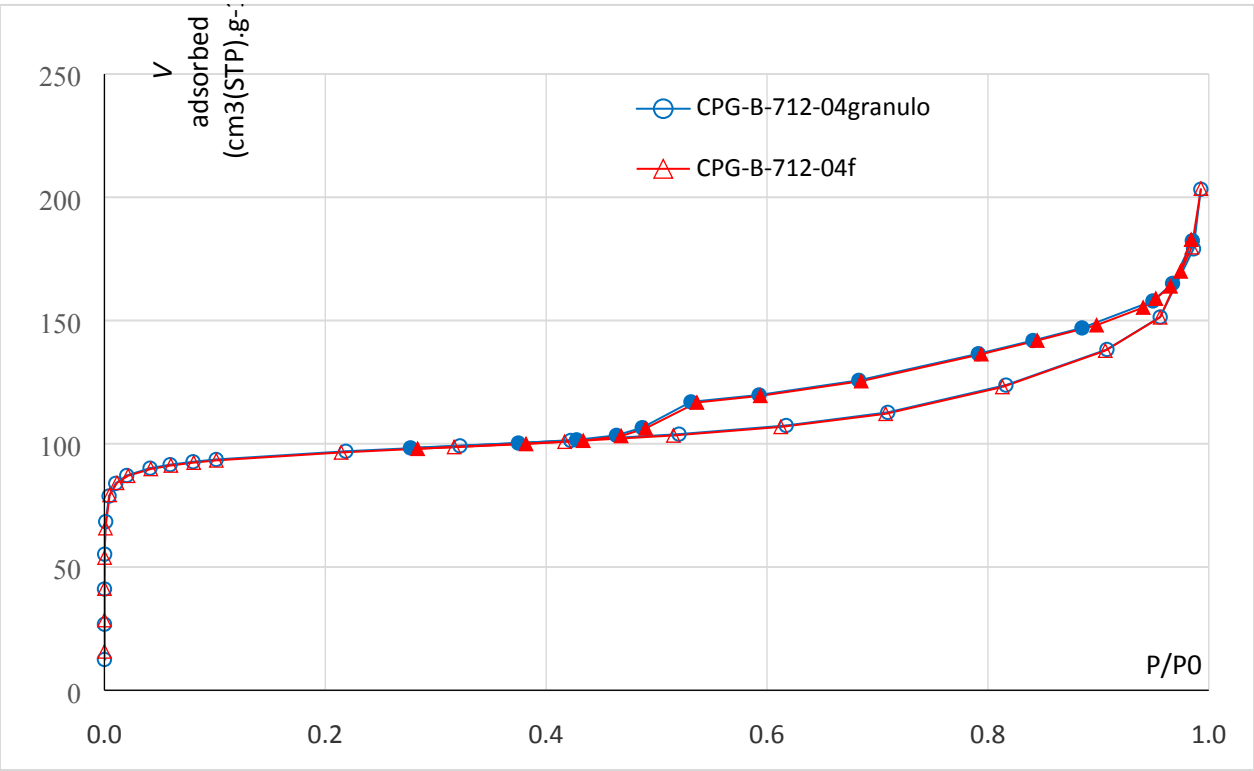

Figure 5 N_2 adsorption / desorption isotherms of hollow Y zeolite crystals before and after mechanical stability test that consists in applying a pressure of 1 ton/inch^2 on hollow crystals.

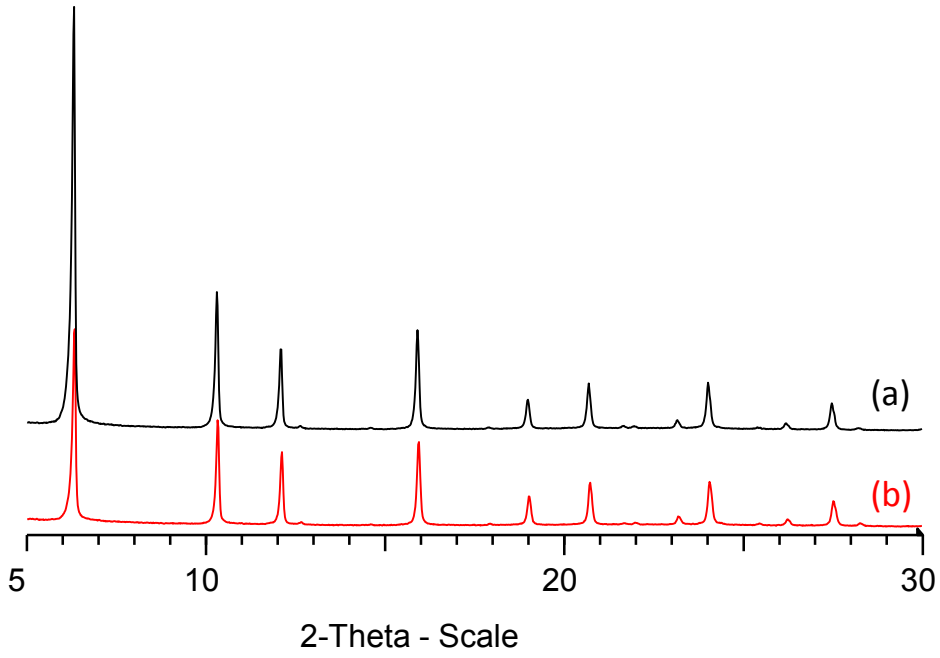

Figure S6 Quantitative comparison of XRD patterns of hollow crystals obtained following the standard 3-steps process (a) and dense crystals when the washing step was omitted (b).

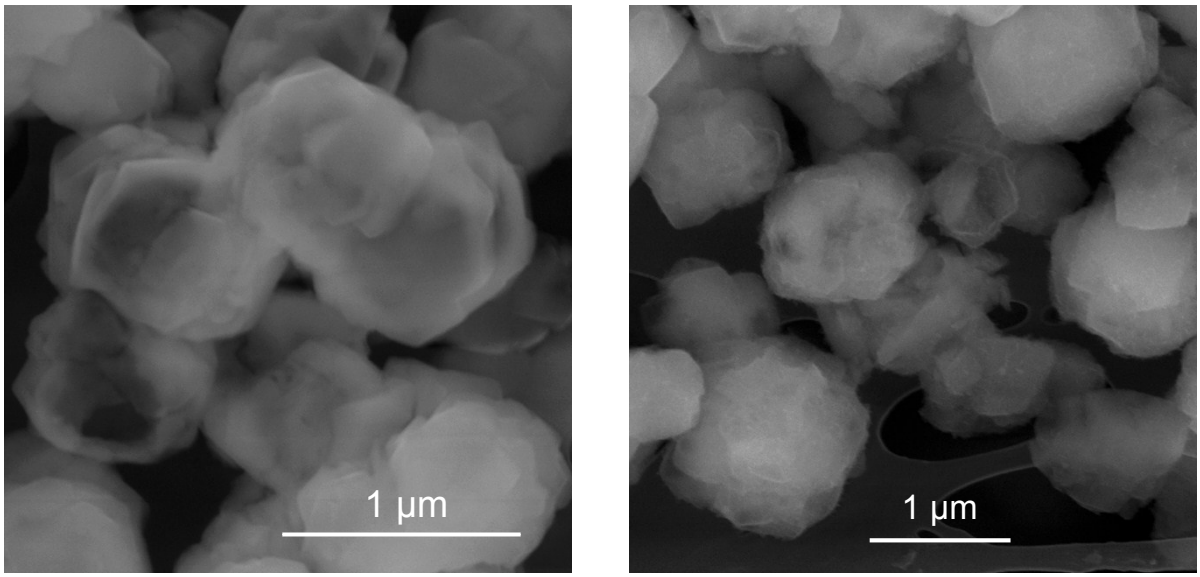

Figure S7 SEM picture of a zeolite obtained following the complete process (three steps, left) and when the second step (acid washing) is omitted (right).

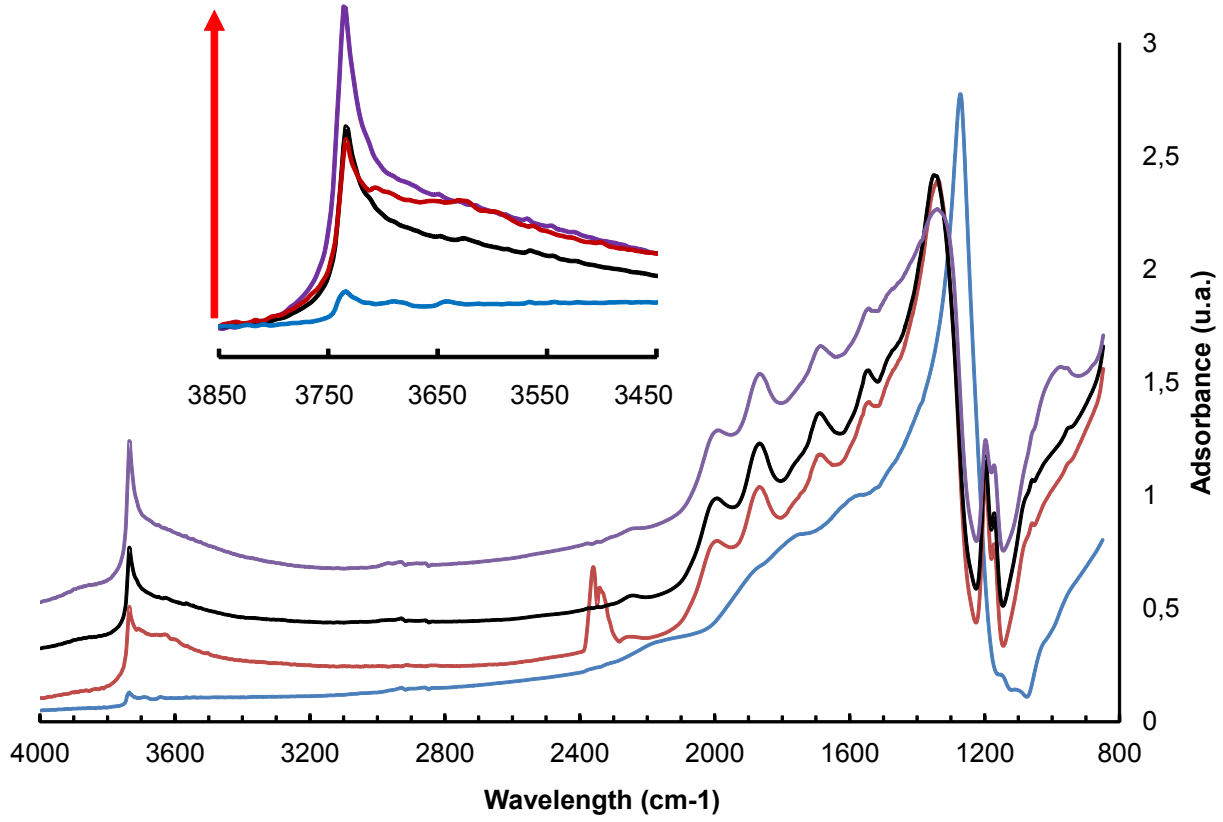

Figure S8 DRIFTS spectra of parent NaY (blue), after dealumination with $SiCl_4$ (red) followed by acid washing (black) and finally desilication in the presence of $NaAlO_2$ (purple). The inset shows the evolution of the band characteristic of silanol groups at 3740 cm^{-1} during the treatment.

NB: The intensity of the hydroxyl stretching bands was compared directly, assuming identical optical pathways for all samples. This assumption is reasonable since the crystals were of the same habit, size and texture. This assumption is further supported by the fact that the backbone vibrations overtones (band between 2100 and 1800 cm^{-1}) of the samples exhibiting the same Si/Al ratio were identical.

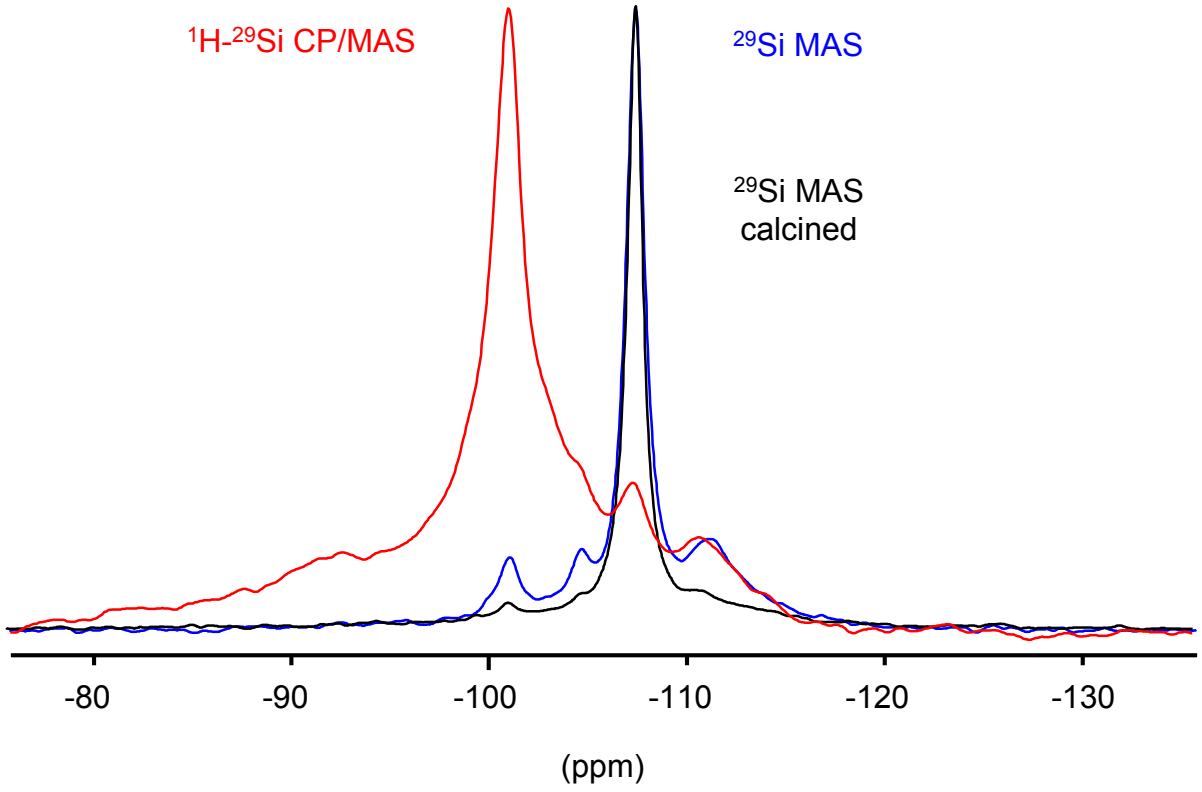

Figure S9 ^{29}Si MAS (blue) and ^{1}H-^{29}Si CP/ MAS (red) NMR spectra of non-calcined hollow Y zeolite crystals. The black curve represents the ^{29}Si MAS spectrum of the calcined material.