Supplementary Information

Sustainable chemical recycling of low-density polyethylene into light olefins over nano-sized SSZ-13

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Supplementary tables and figures

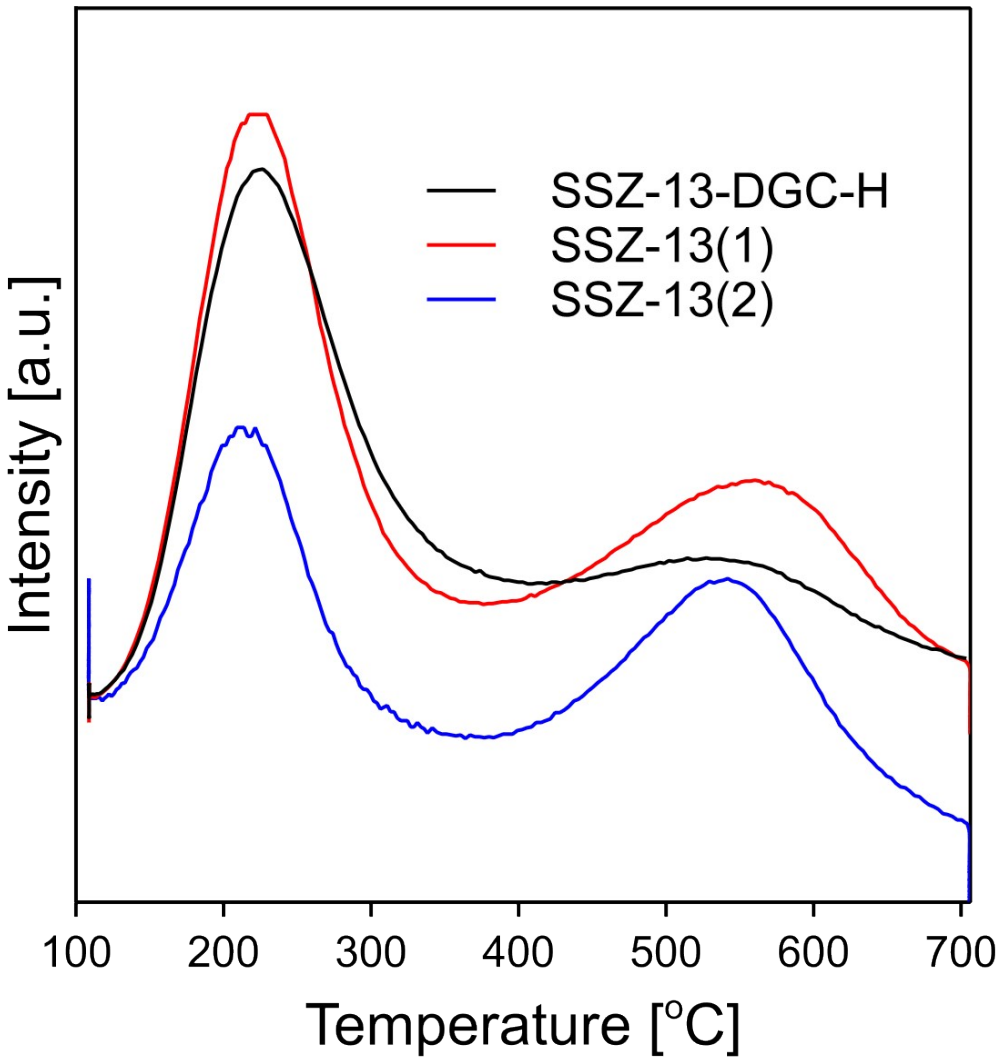


Fig. S1 NH_3-TPD profiles of SSZ-13-DGC-H, SSZ-13(1) and SSZ-13(2).

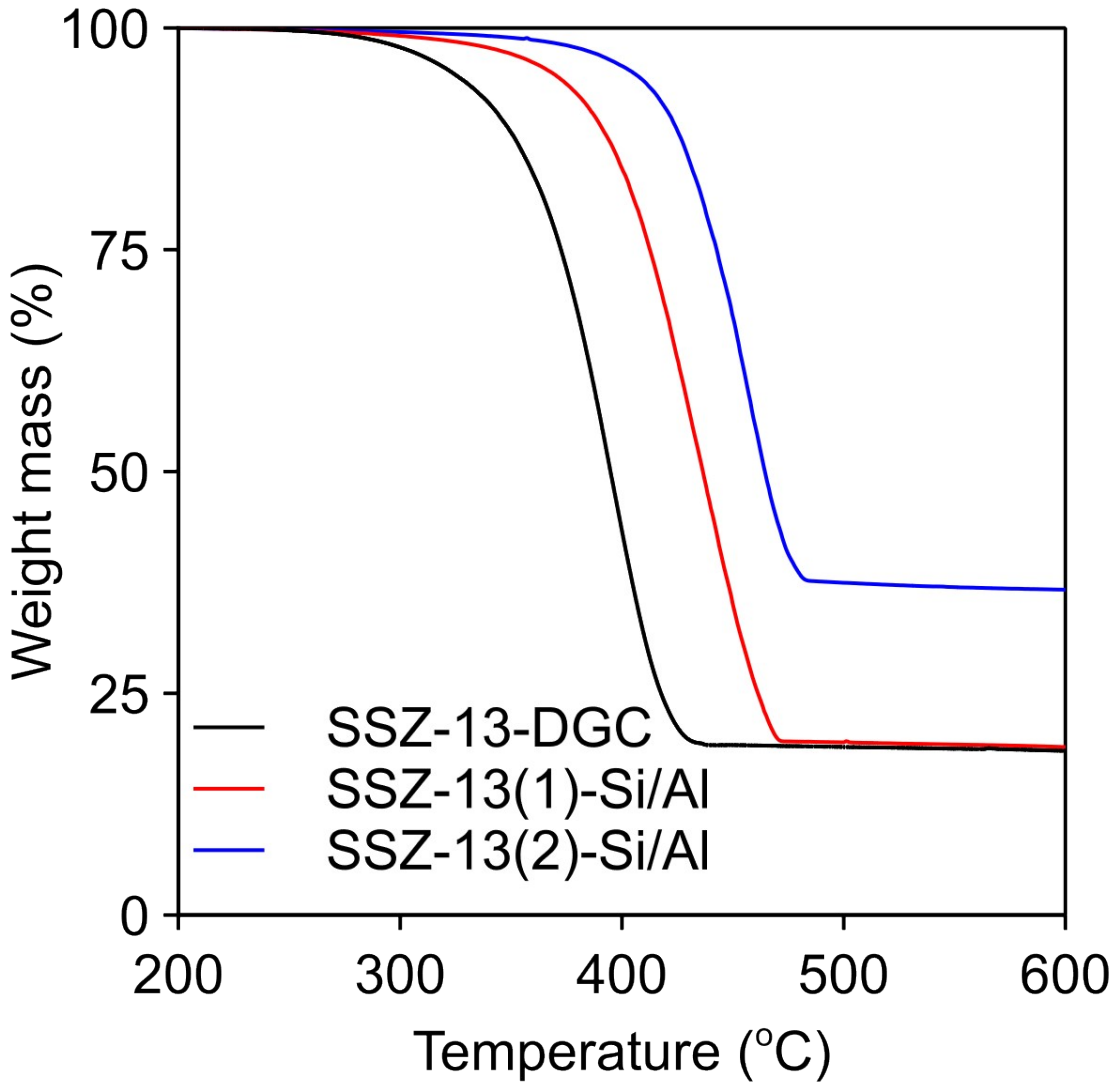


Fig. S2 TG curves obtained in the catalytic cracking of LDPE with SSZ-13-DGC, SSZ-13(1)-Si/Al and SSZ-13(2)-Si/Al.

(Based on the Si/Al ratio of SSZ-13-DGC-H, the masses of SSZ-13(1) and SSZ-13(2) were adjusted to yield the same amount of Al as in LDPE. The resulting samples are denoted as SSZ-13(1)-Si/Al and SSZ-13(2)-Si/Al, respectively.)

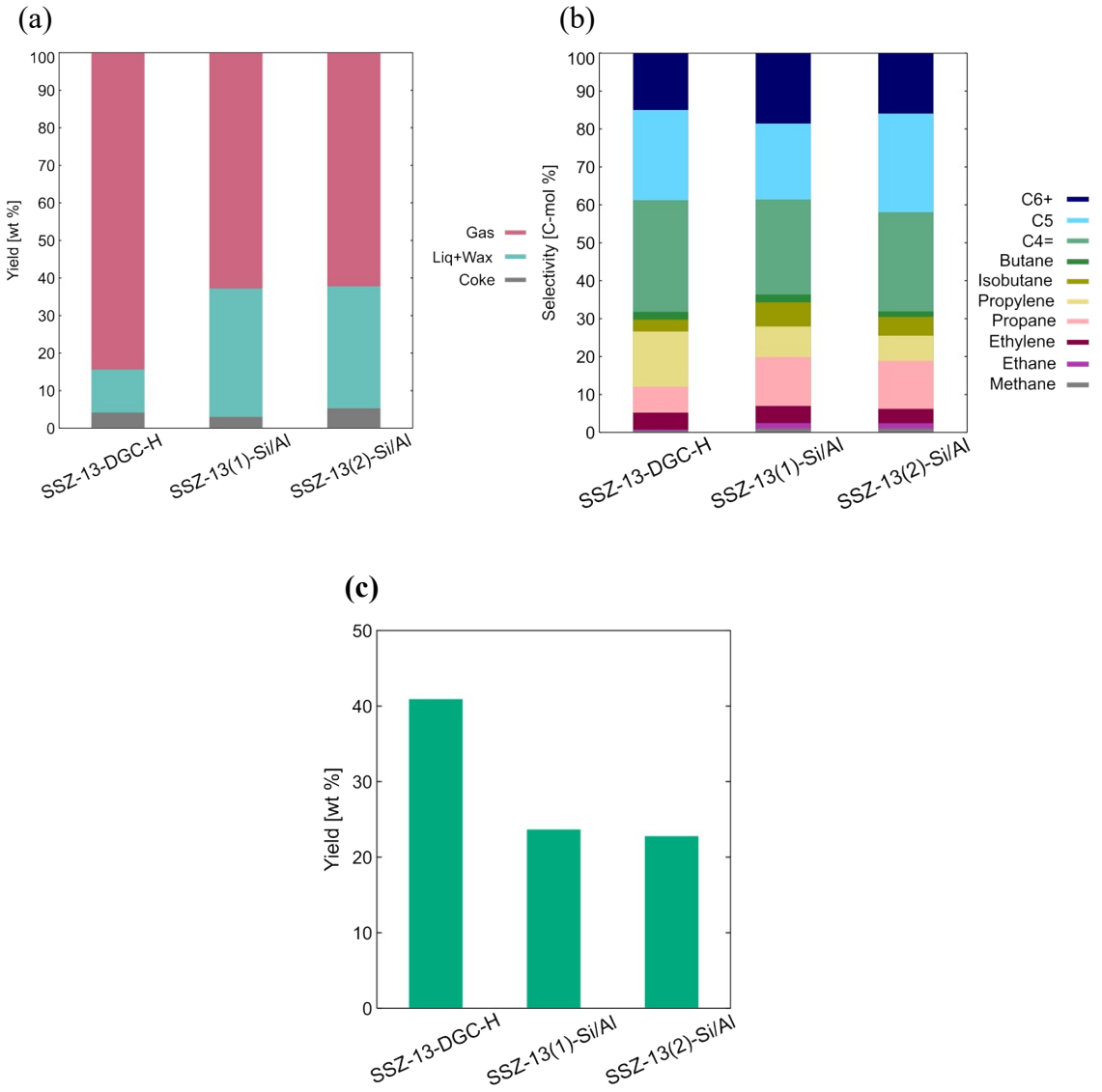
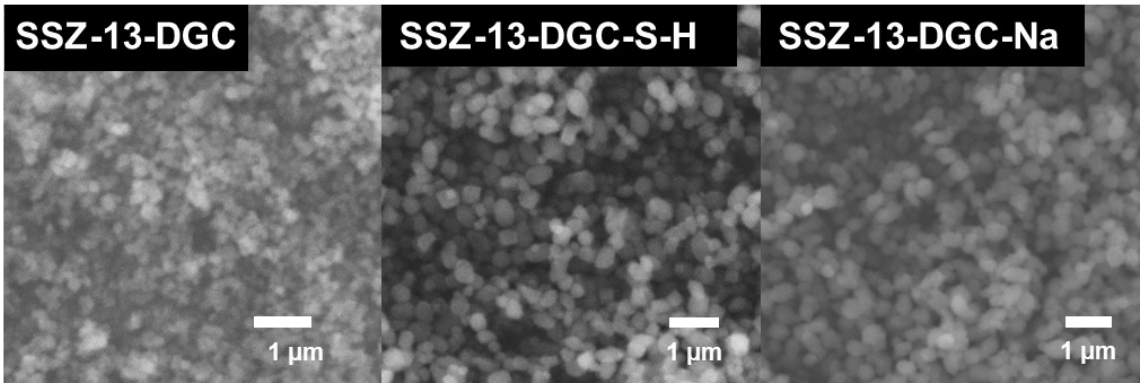


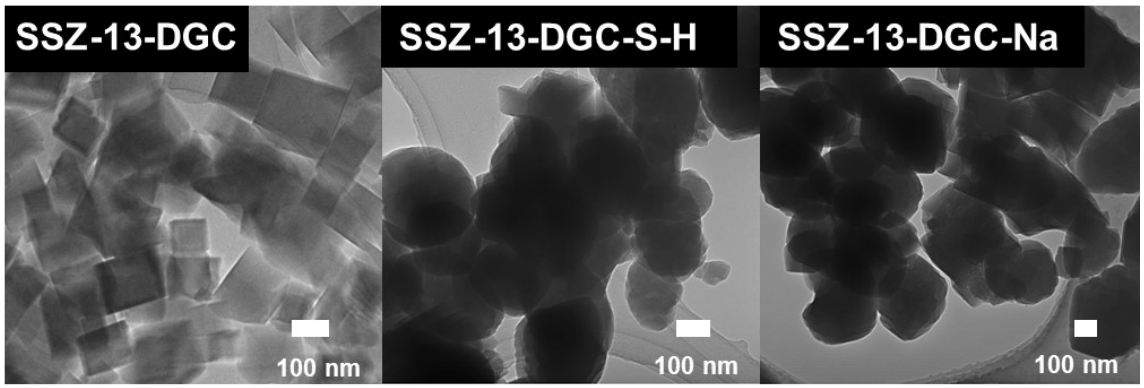
Fig. S3 a) Yields for each phase, b) gas product distribution and c) yield for light olefins (ethylene + propylene + butene) in catalytic cracking of LDPE over SSZ-13-DGC-H, SSZ-13(1)-Si/Al and SSZ-13(2)-Si/Al.



(a)

(b)

Fig. S4 a) SEM images of each sample and b) TEM images of SSZ-13-DGC, SSZ-13-DGC-S-H, SSZ-13-DGC-Na



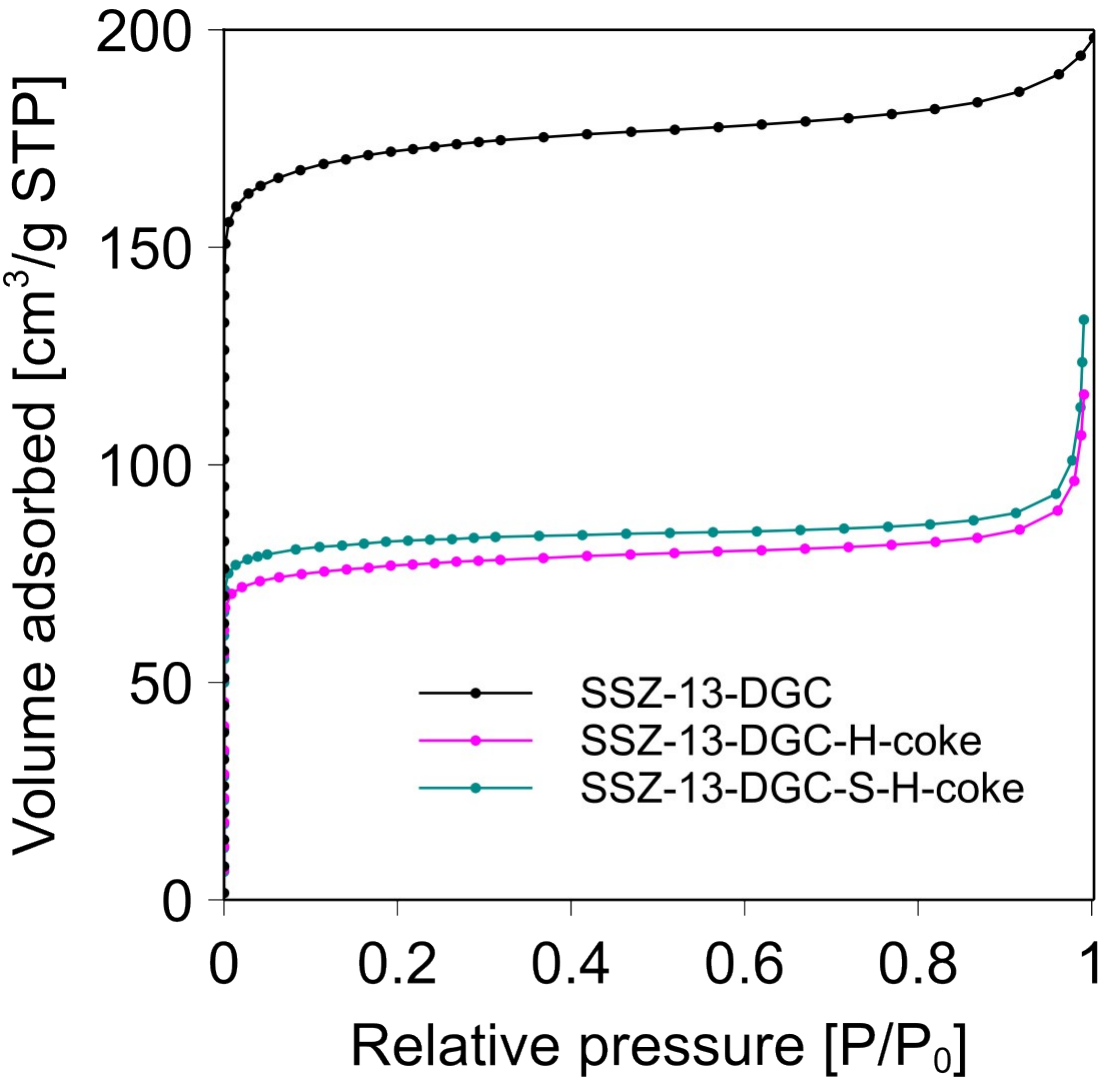


Fig. S5 N_2 isotherms of SSZ-13-DGC, SSZ-13-DGC-H-coke and SSZ-13-DGC-S-H-coke.

Table S1 S_{BET} and S_{ext} of SSZ-13-DGC, SSZ-13-DGC-S-H-coke and SSZ-13-DGC-S-H-coke.

Samples	$S_{BET}[m^2/g]$	$S_{ext}[m^2/g]$
SSZ-13-DGC	613.0	28.6
SSZ-13-DGC-H-coke	307.6	13.7
SSZ-13-DGC-S-H-coke	333.6	12.8

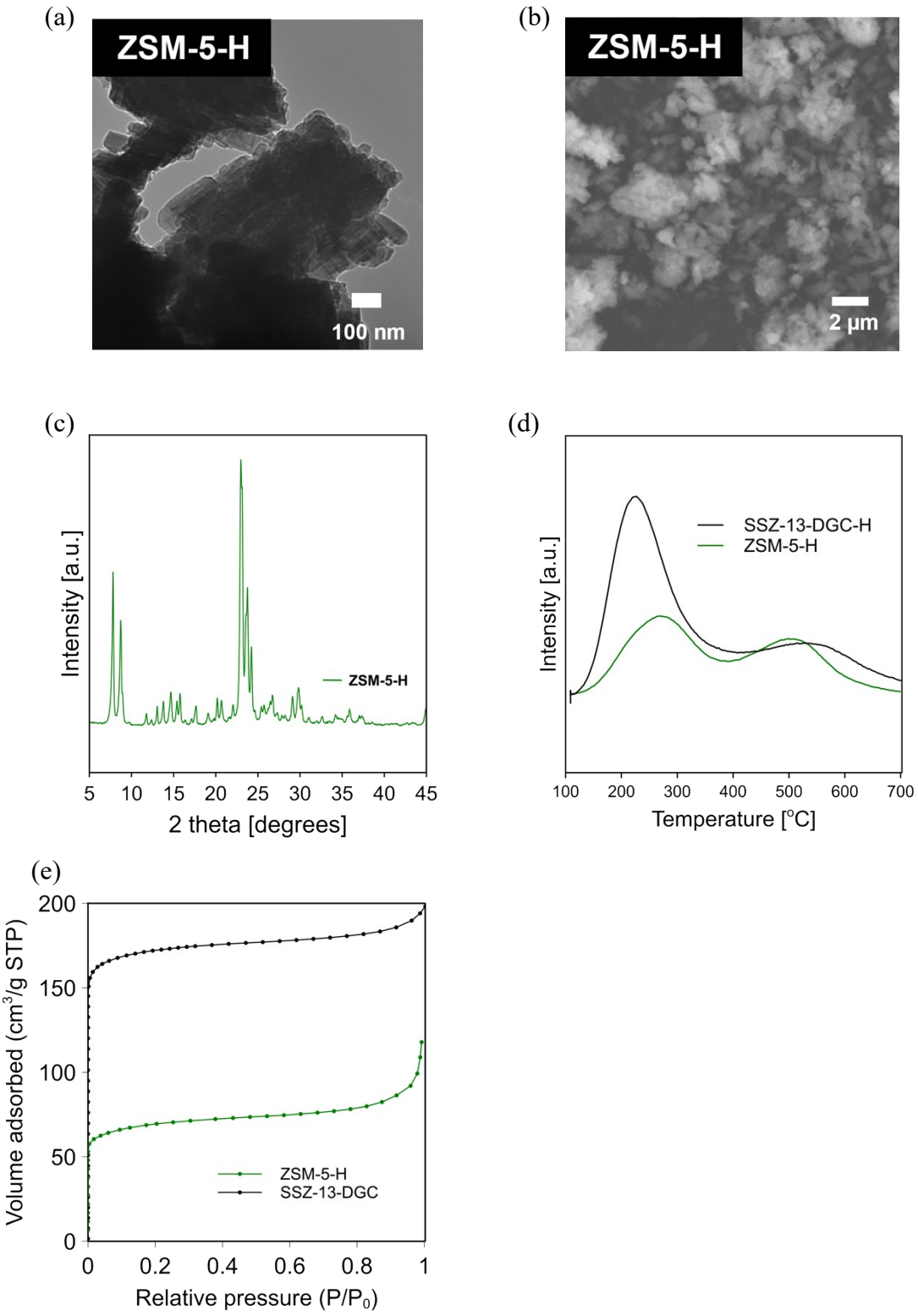


Fig. S6 a) SEM image and b) TEM image c) XRD pattern d) NH_3-TPD profiles and e) N_2 isotherms of ZSM-5-H

Table S2 Physical properties of ZSM-5.

Samples	S_{BET} [m^2/g]	S_{ext} [m^2/g]	Si/Al [-]
ZSM-5-H	241.6	21.7	11.5