Supplementary Information

Catalytic Transformation Conditions of Ethanol on Dealuminated BEA Zeolites

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Table S1. Textural properties of dealuminated HB zeolite: BET specific surface area (S_{BET}), external surface area (S_{Ext}, obtained by t-plot method), microporous surface area (S_{Micro}, BET – t-plot external area) and mesoporous surface area (S_{Meso}, obtained by BJH method)

Catalyst	S_{BET} / (m^2 g^{-1})	S_{Ext} / (m^2 g^{-1})	S_{Micro} / (m^{2}g^{-1})	S_{Meso} / (m^2 g^{-1})
HB	648	192	457	227
HB(80)10.R.HW	653	197	456	234
HB(150)10.D.RB	608	190	406	218
HB(150)10.H.RB	626	192	423	223
HB(150)10.H.HB	607	184	423	213
HB(150)10.H.HW	619	193	415	223
HB(190)70.H.RB	596	184	400	213
HB(190)70.H.NW	462	125	338	169

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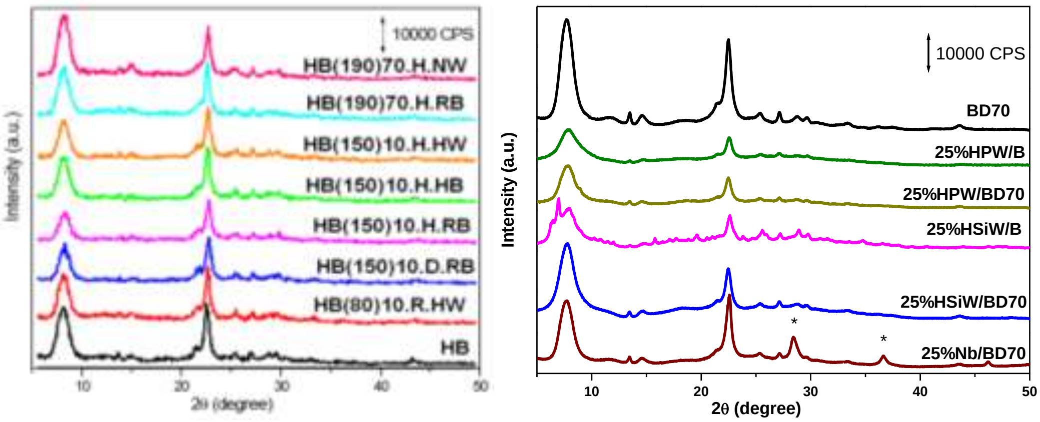


Figure S1. XRD patterns of the catalysts; *shows the presence of T-Nb_2O_5 phase; BD70 is the same as HB(190)70.H.RB.

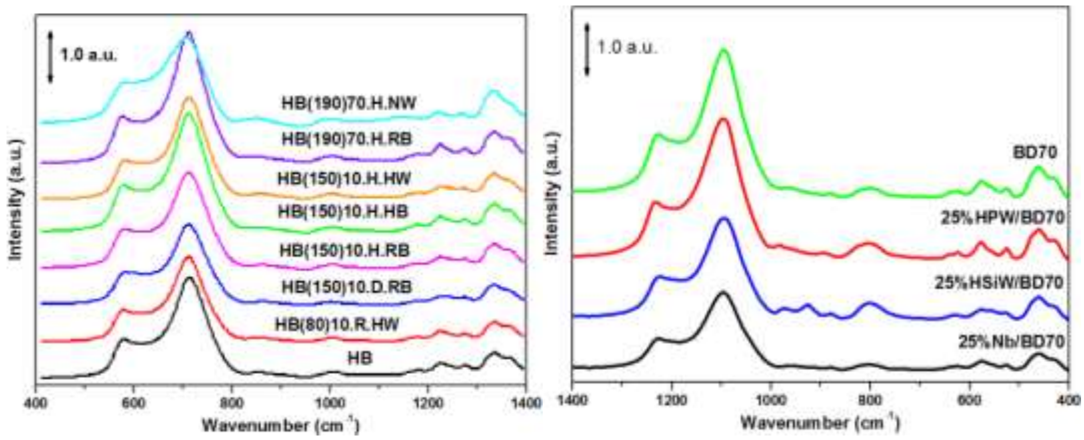


Figure S2. FTIR spectra of the catalysts; BD70 is the same as HB(190)70.H.RB.

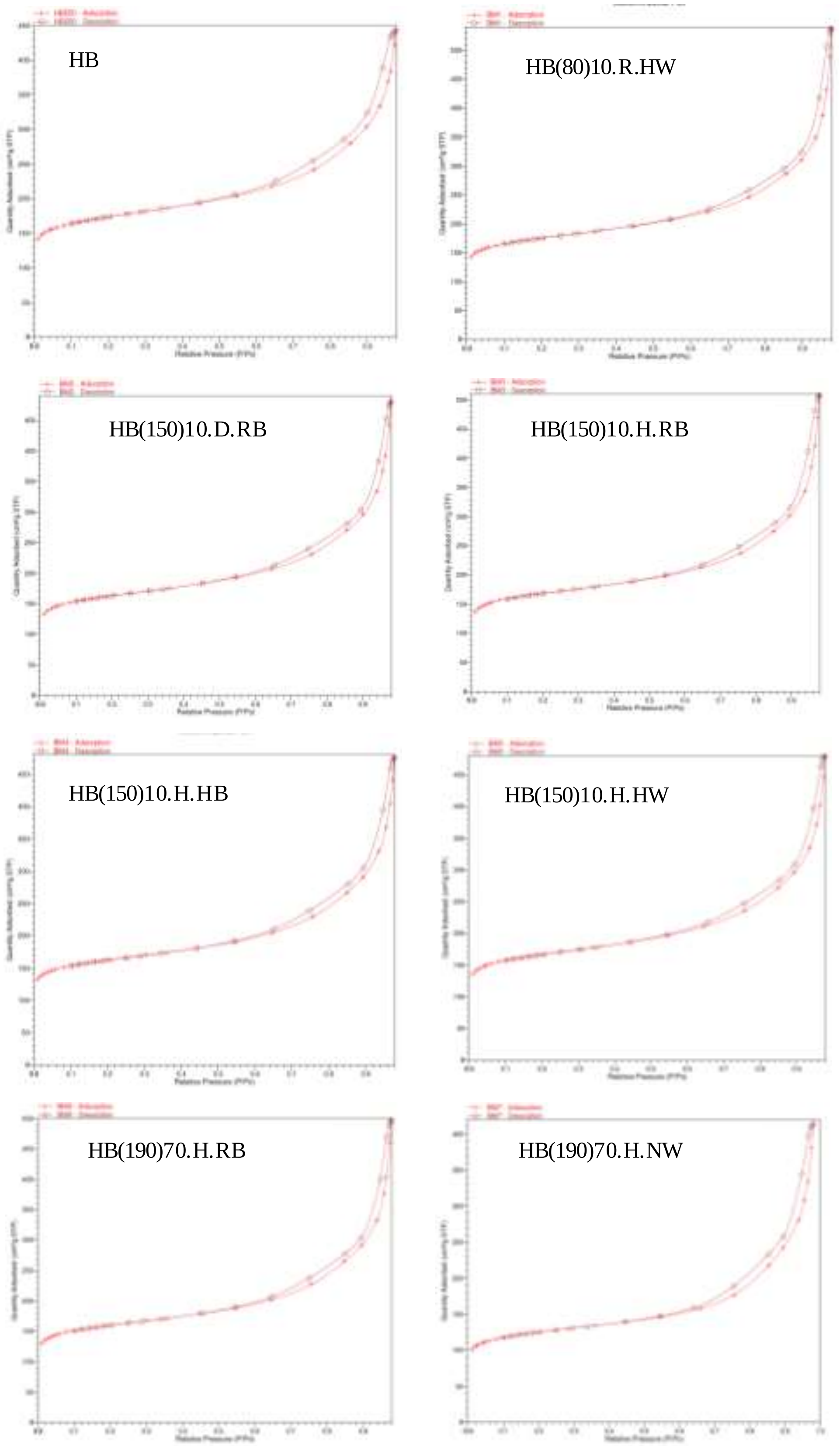


Figure S3. N_2 adsorption/desorption linear isotherms of HB and dealuminated HB zeolites.

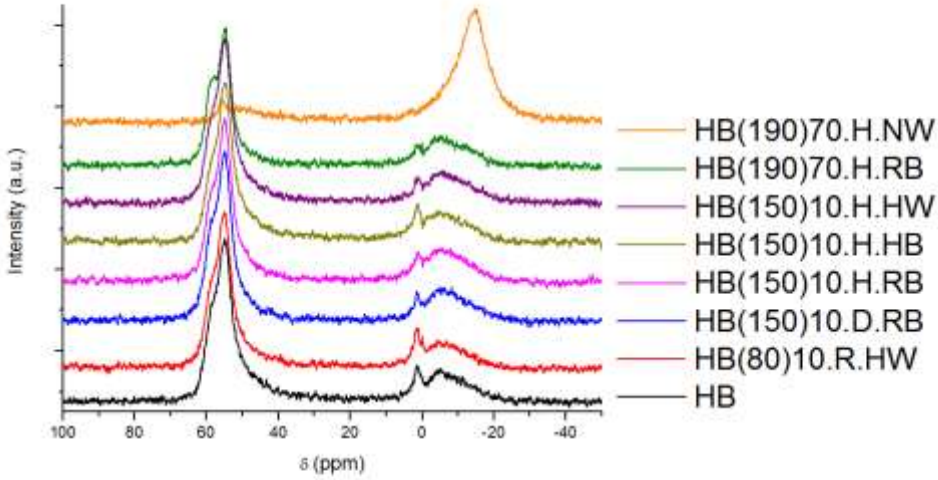
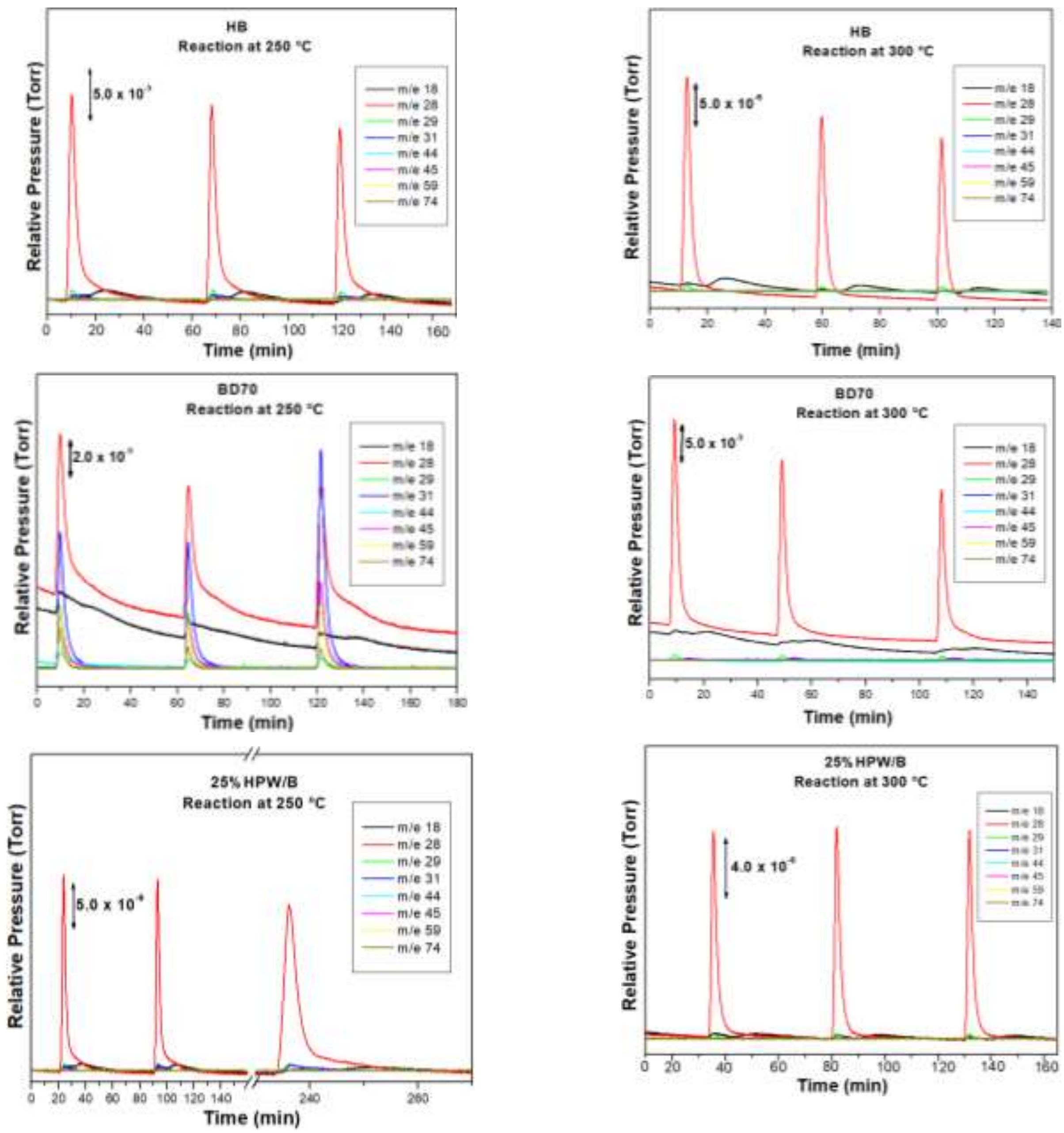


Figure S4. ^{27}Al MAS NMR spectra of HB and dealuminated HB zeolites.



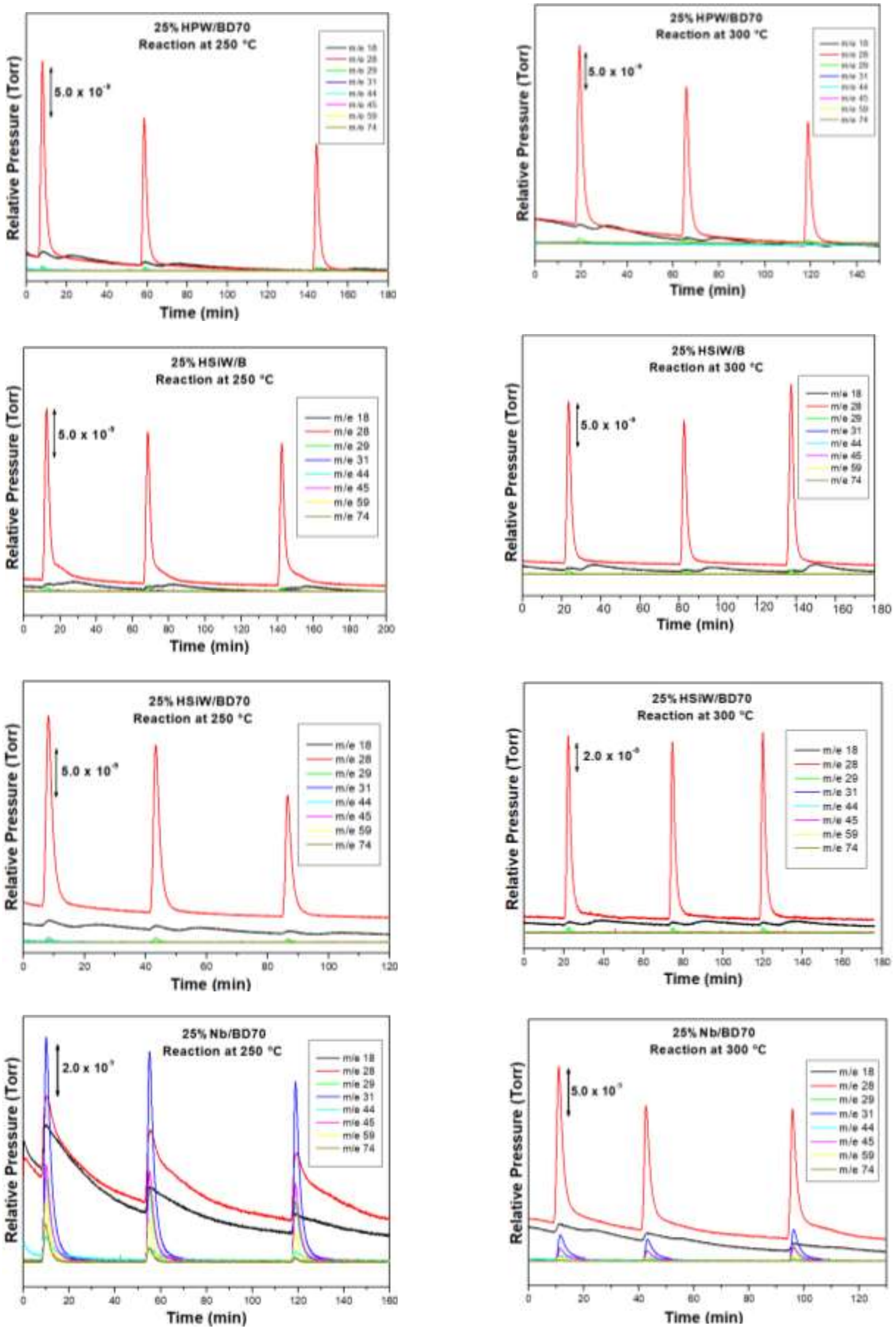
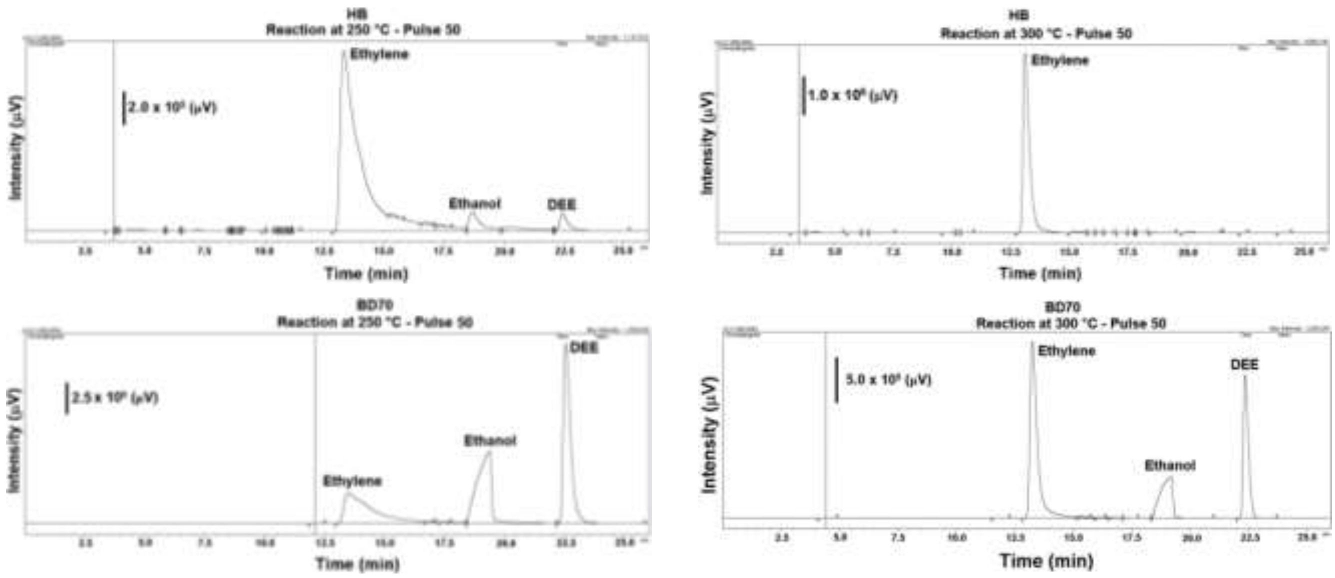


Figure S5. Continuous mass spectra of for the catalytic dehydration of ethanol at different temperatures using different catalysts. BD70 is the same as HB(190)70.H.RB.

The reaction products were determined via their respective mass fragments (m/e): 18 (base peak of water); 28 (base peak of ethylene); 29 and 44 (base peak and 80% peak of acetaldehyde, respectively); 31 and 45 (base peak and 55% peak of ethanol, respectively); and 59 and 74 (80 and 50% peak of diethyl ether, respectively). The pattern of fragmentation by electron ionization followed and compared to the NIST Mass Spectrometry Data Center (https://webbook.nist.gov/). Every care was taken to determine, in separate experiments, the possible peaks from the pattern of fragmentation of other common products (e.g., CO, CO_2) to make the unequivocal assignment.



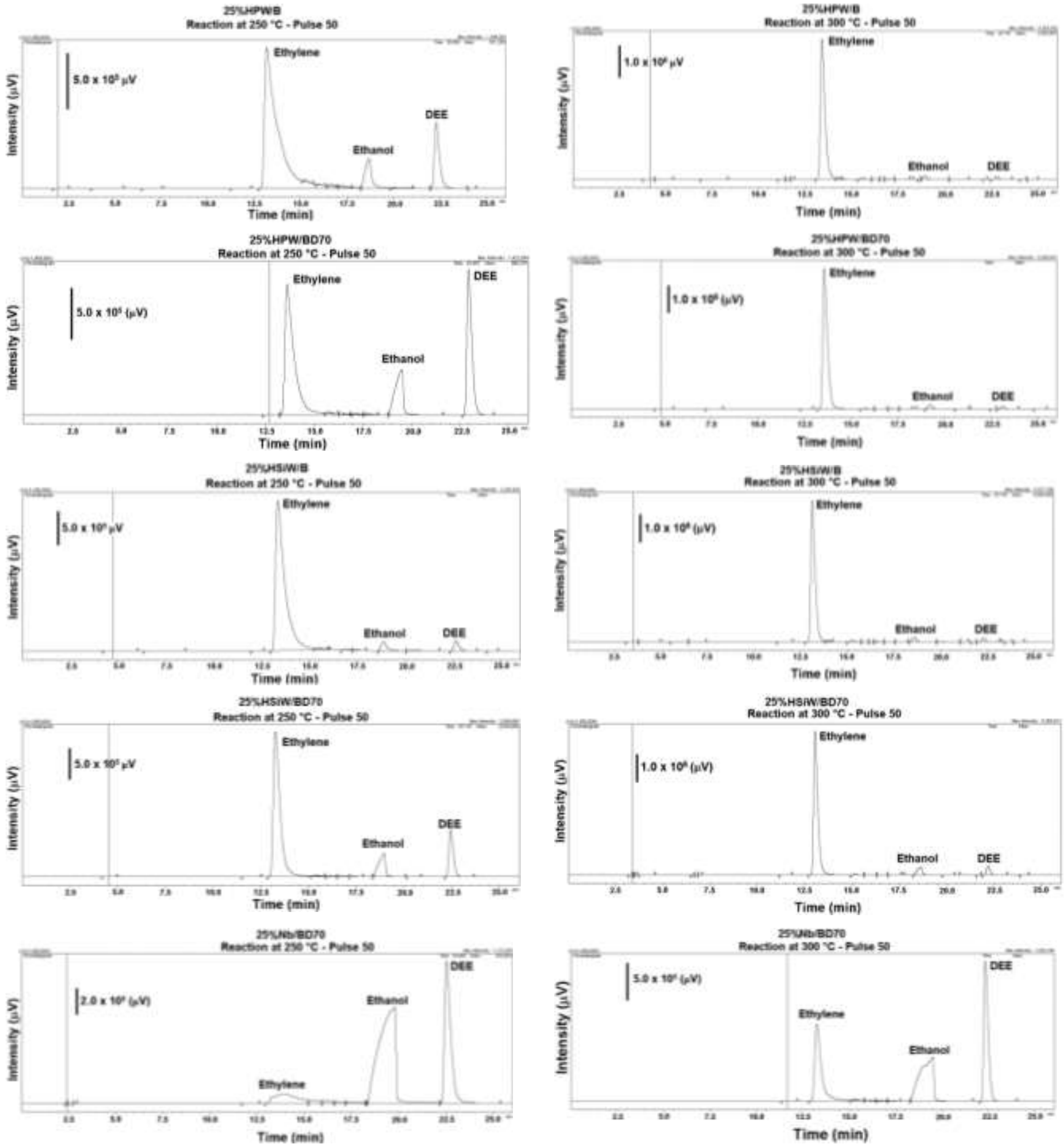


Figure S6. Chromatograms from the lifetime test of catalytic ethanol dehydration reaction.