Supporting Information

Figure S1/4
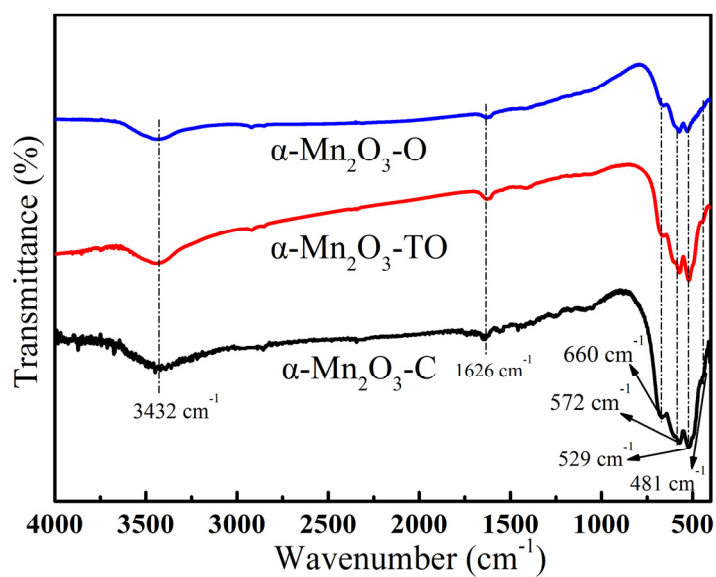

Figure S1. FT-IR spectra of α-Mn$_2$O$_3$ catalysts with different morphologies.

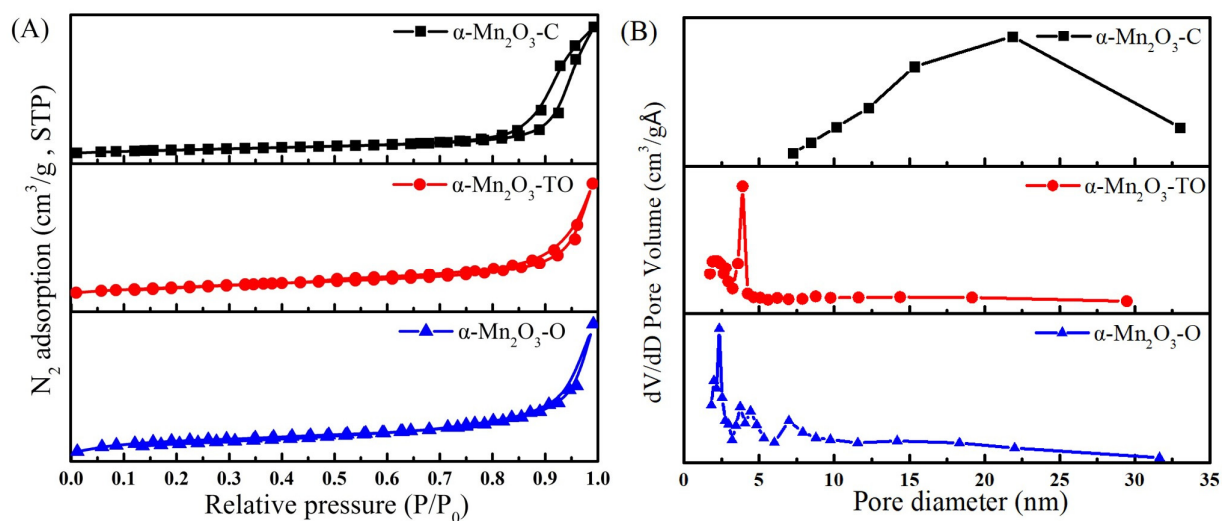## Figure S2/4

Figure S2. N_2 adsorption-desorption isotherms (A), and the pore size distributions (B) of three α-Mn_2O_3 catalysts.
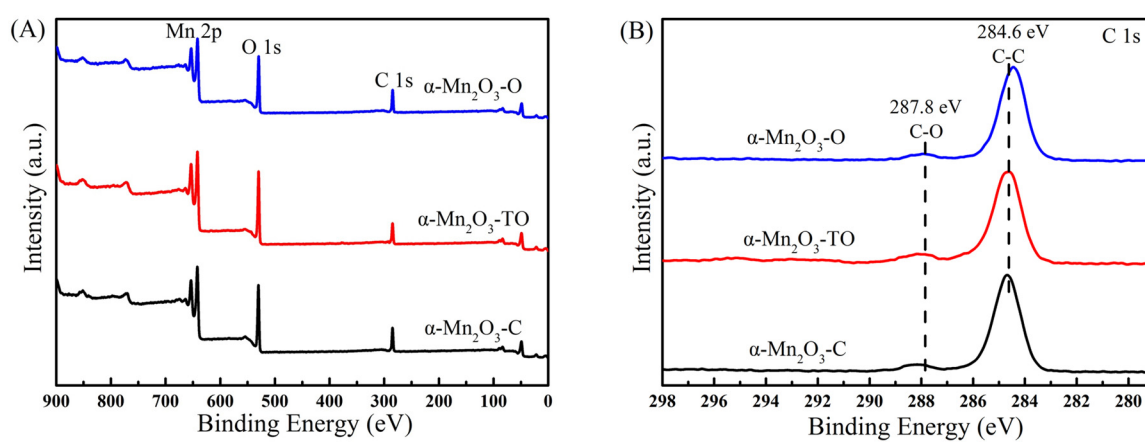
Figure S3/4

Figure S3. XPS patterns of the survey (A) and C 1s (B) of different morphologies α-Mn₂O₃

catalysts.

Figure S4/4
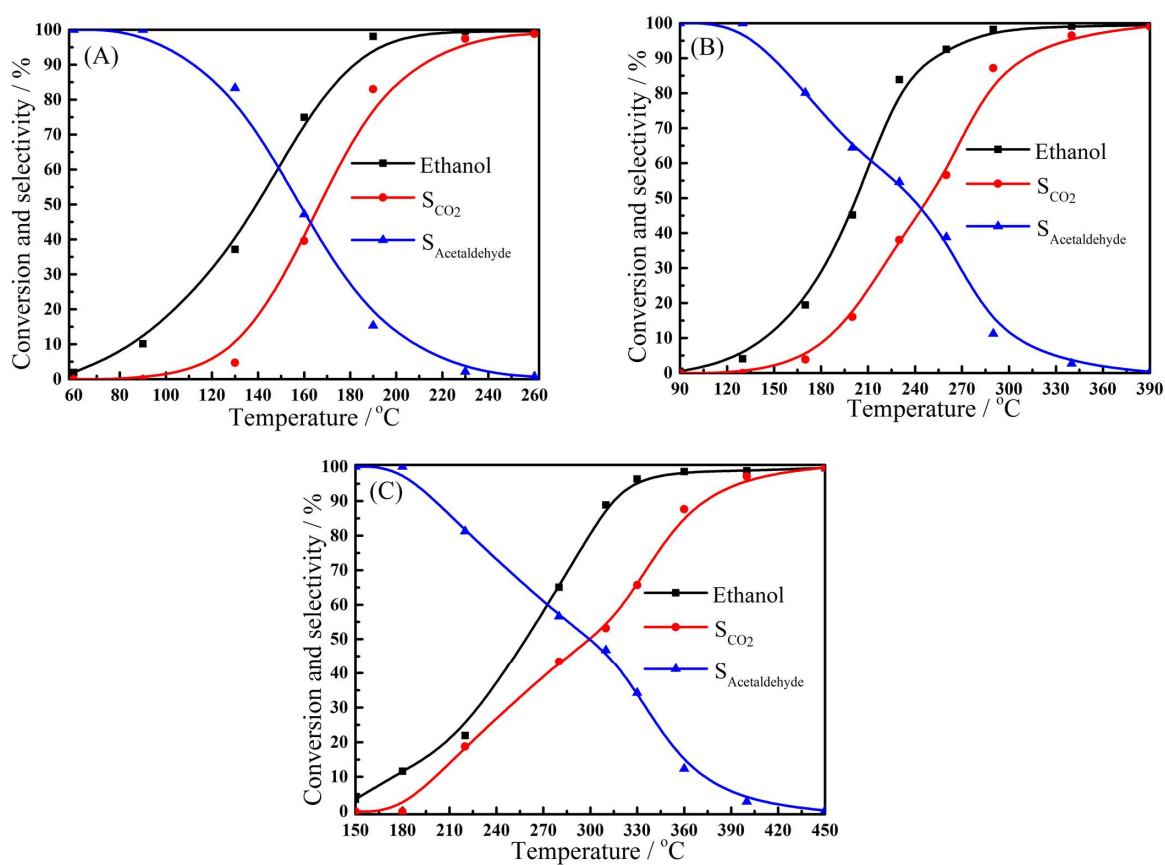

Figure S4. Ethanol conversion, acetaldehyde and CO_2 selectivity profiles of ethanol catalytic performance over α-Mn_2O_3 catalysts with different morphologies. α-Mn_2O_3-C (A), α-Mn_2O_3-TO (B), α-Mn_2O_3-O (C) under normal conditions.