# Efficient glycolysis of used PET bottles into a high-quality valuable monomer using a shape-engineered MnOₓ nanocatalyst

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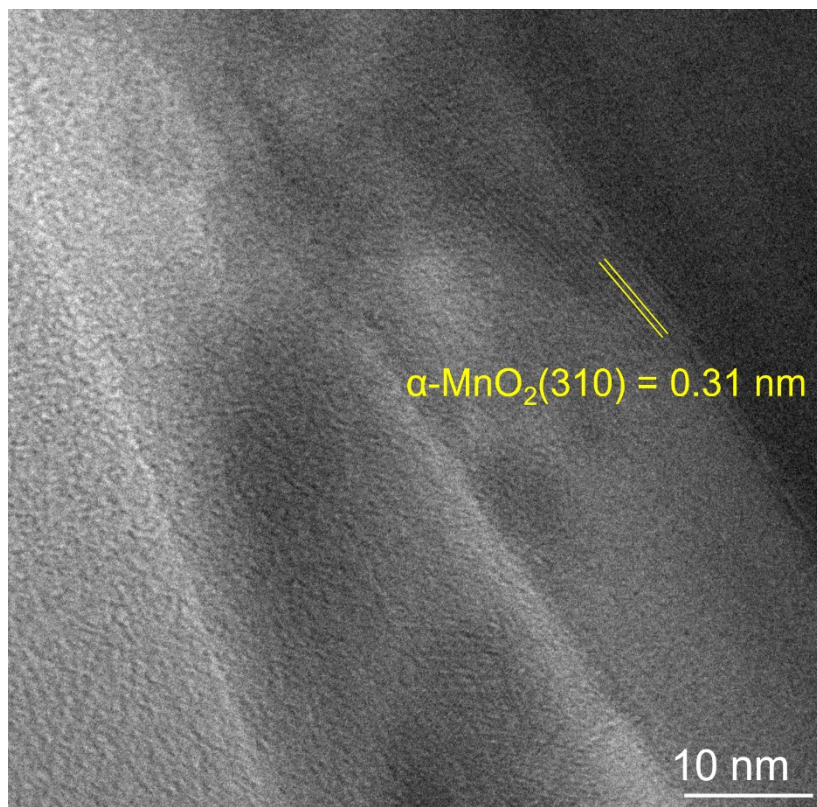
*Email: sudarsanam.putla@chy.iith.ac.in

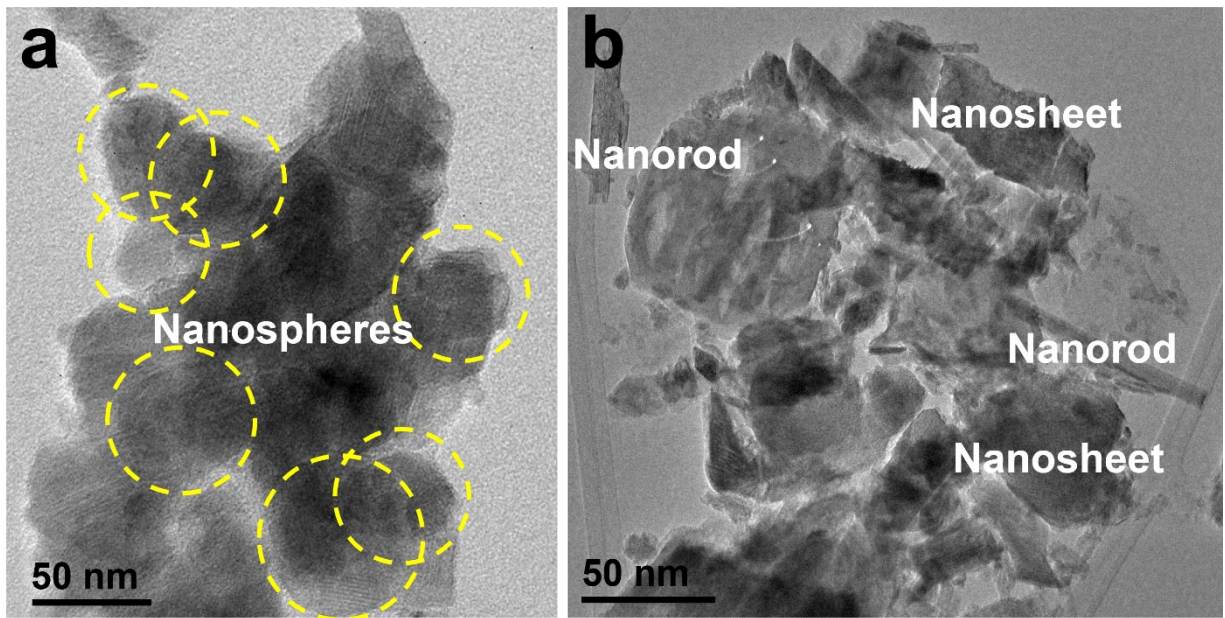Fig. S1: High-resolution TEM image of MnO$_x$ -500 nanorod catalyst.

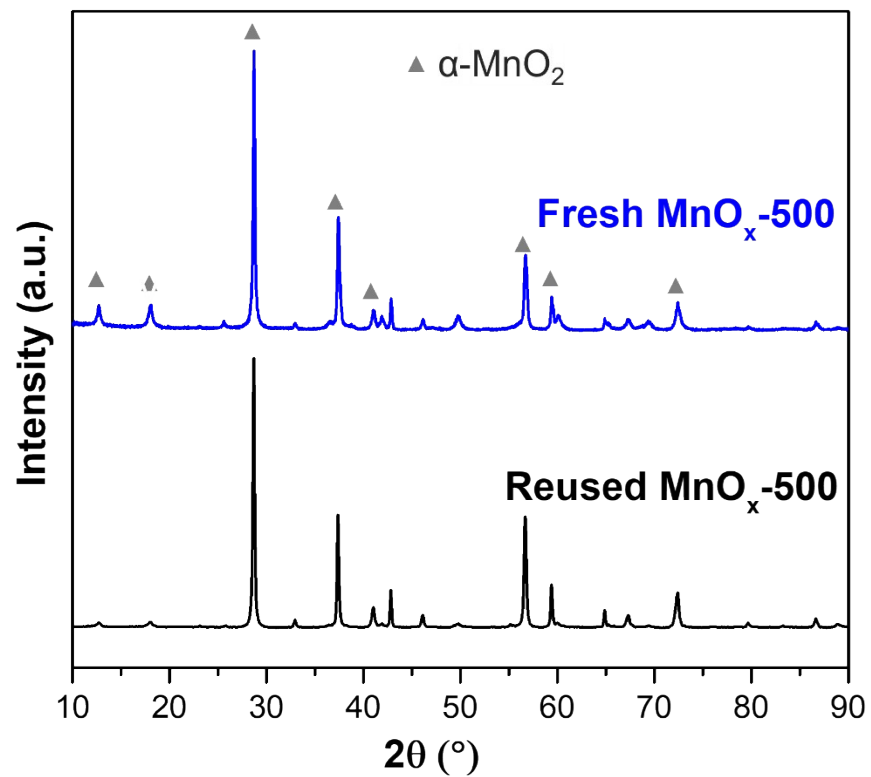Fig. S2: TEM images of (a) $MnO_x$-500 nanospheres and (b) commercial $MnO_2$.

Fig. S3: Powder XRD analysis of fresh and reused $MnO_x$-500 catalysts.

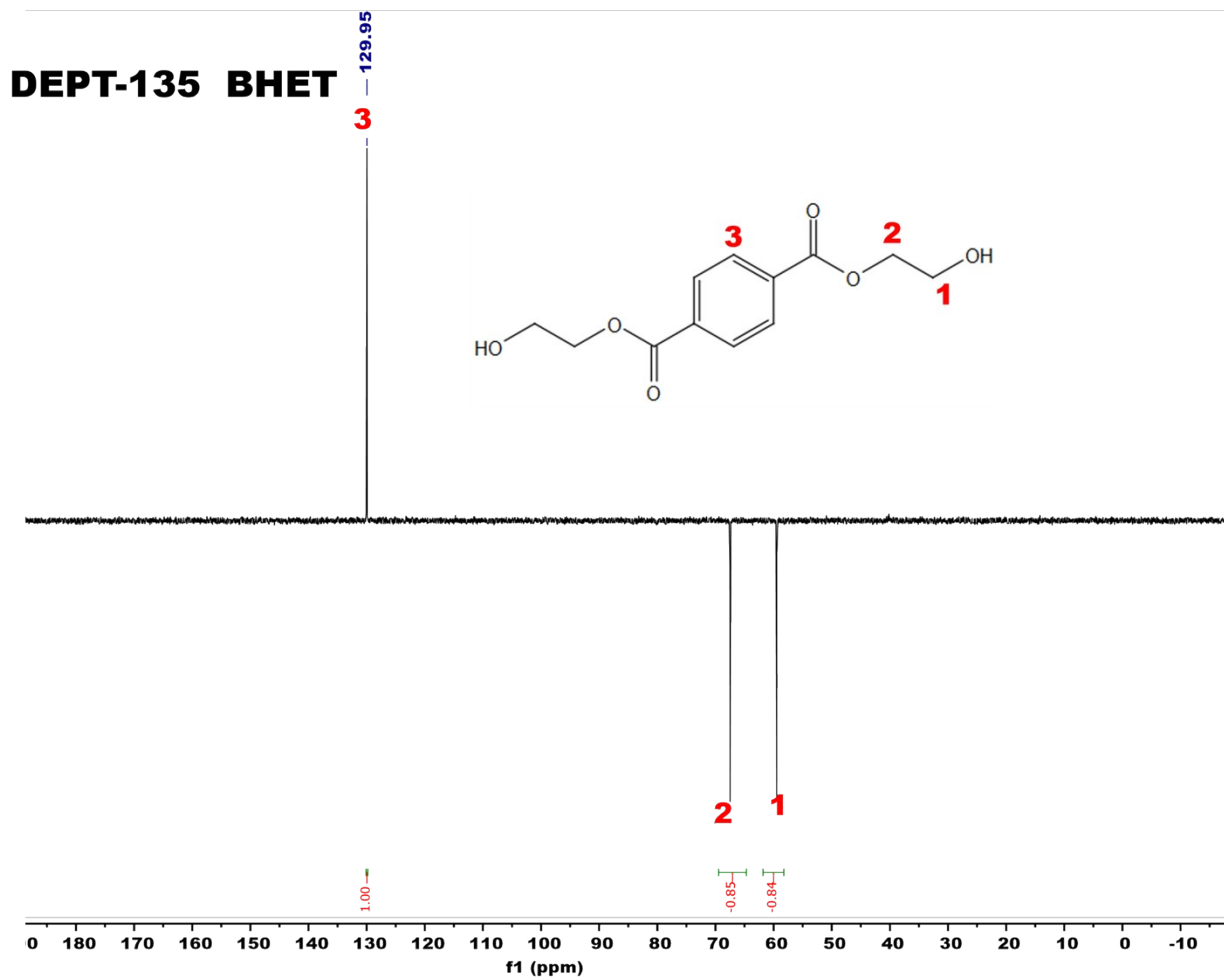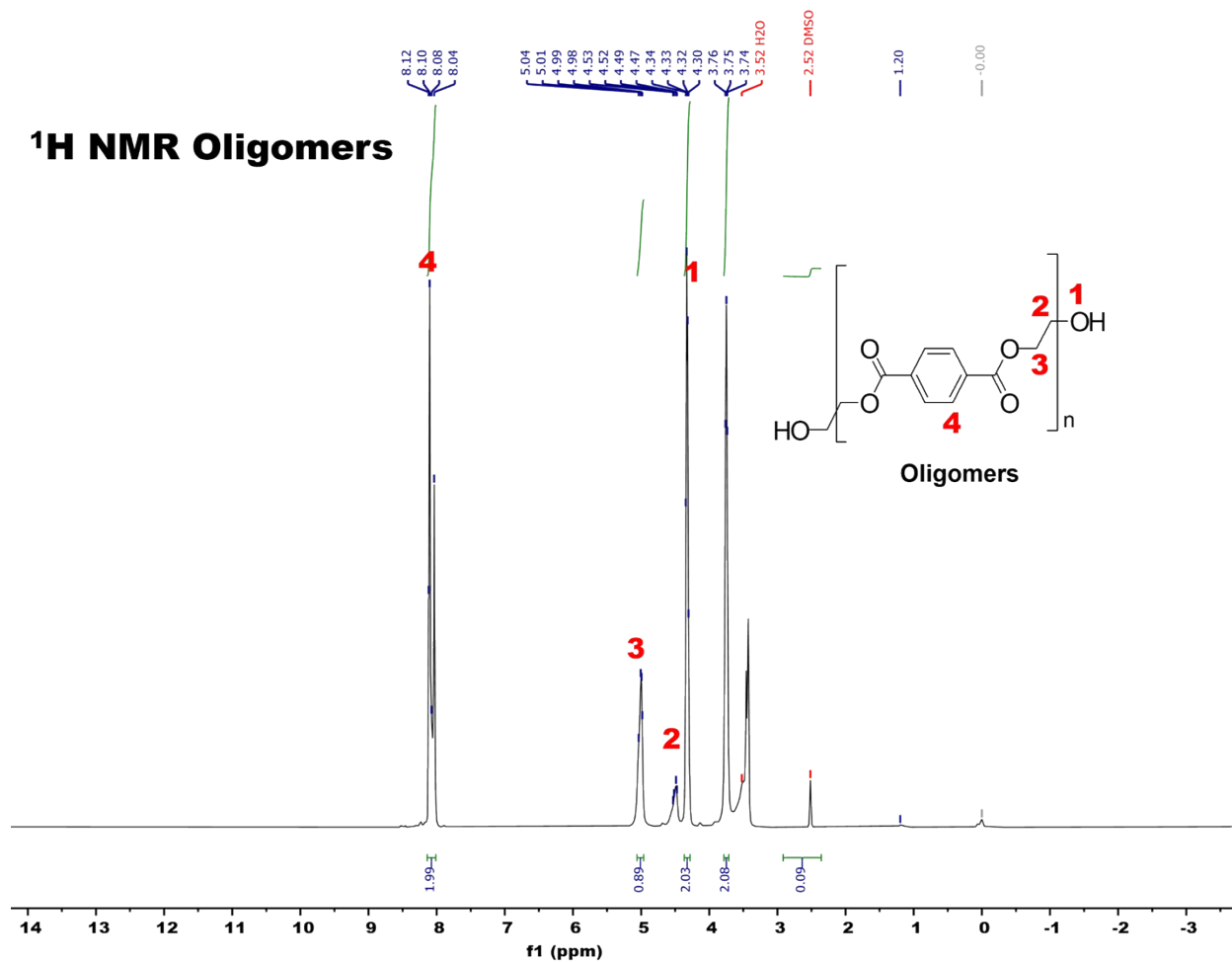Fig. S4: DEPT 135º analysis of BHET monomer.

Fig. S5: $^1$H NMR analysis of PET oligomers.

# ¹³C NMR oligomers


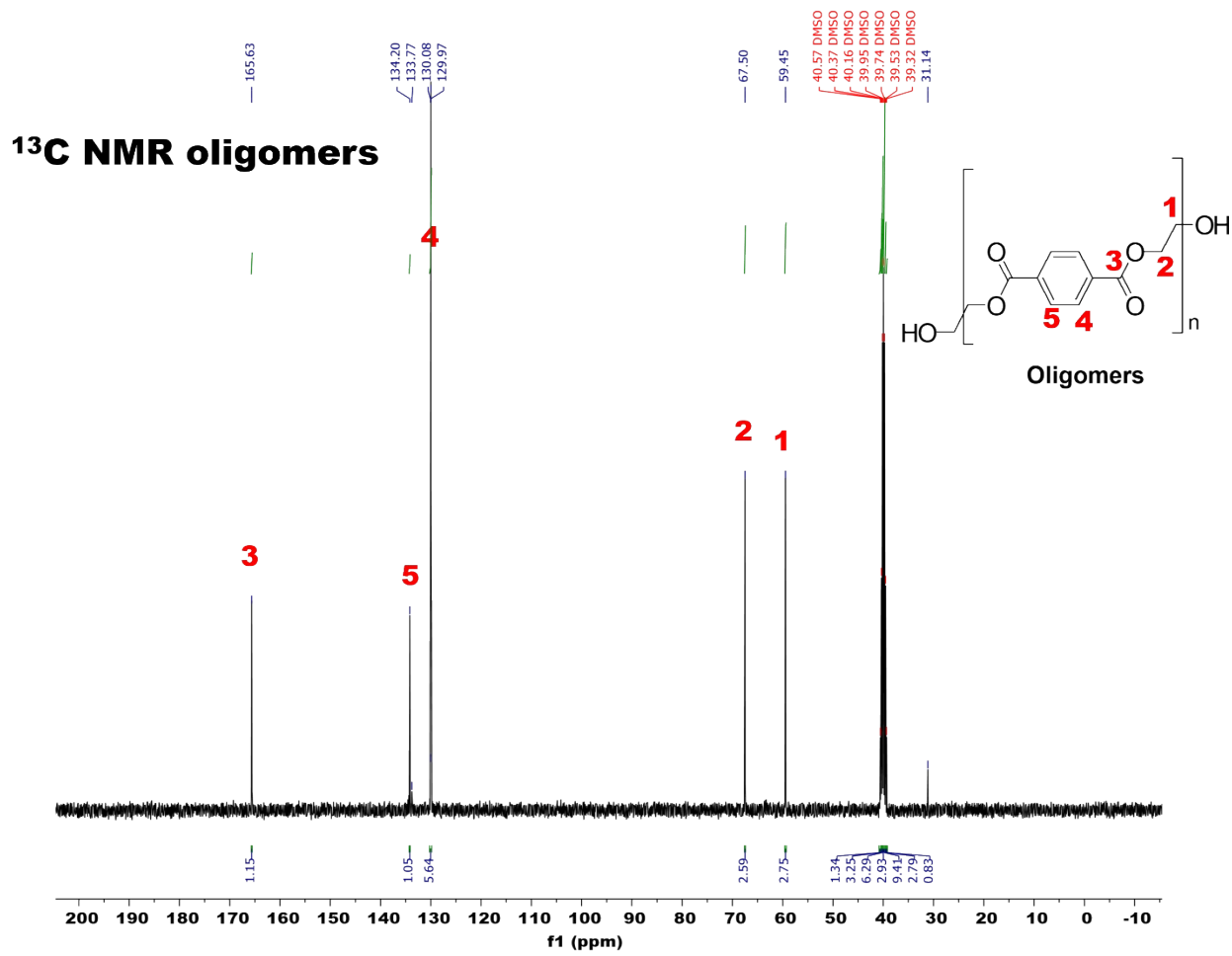
Fig. S6: ¹³C NMR analysis of PET oligomers.

# DEPT-135 Oligomers
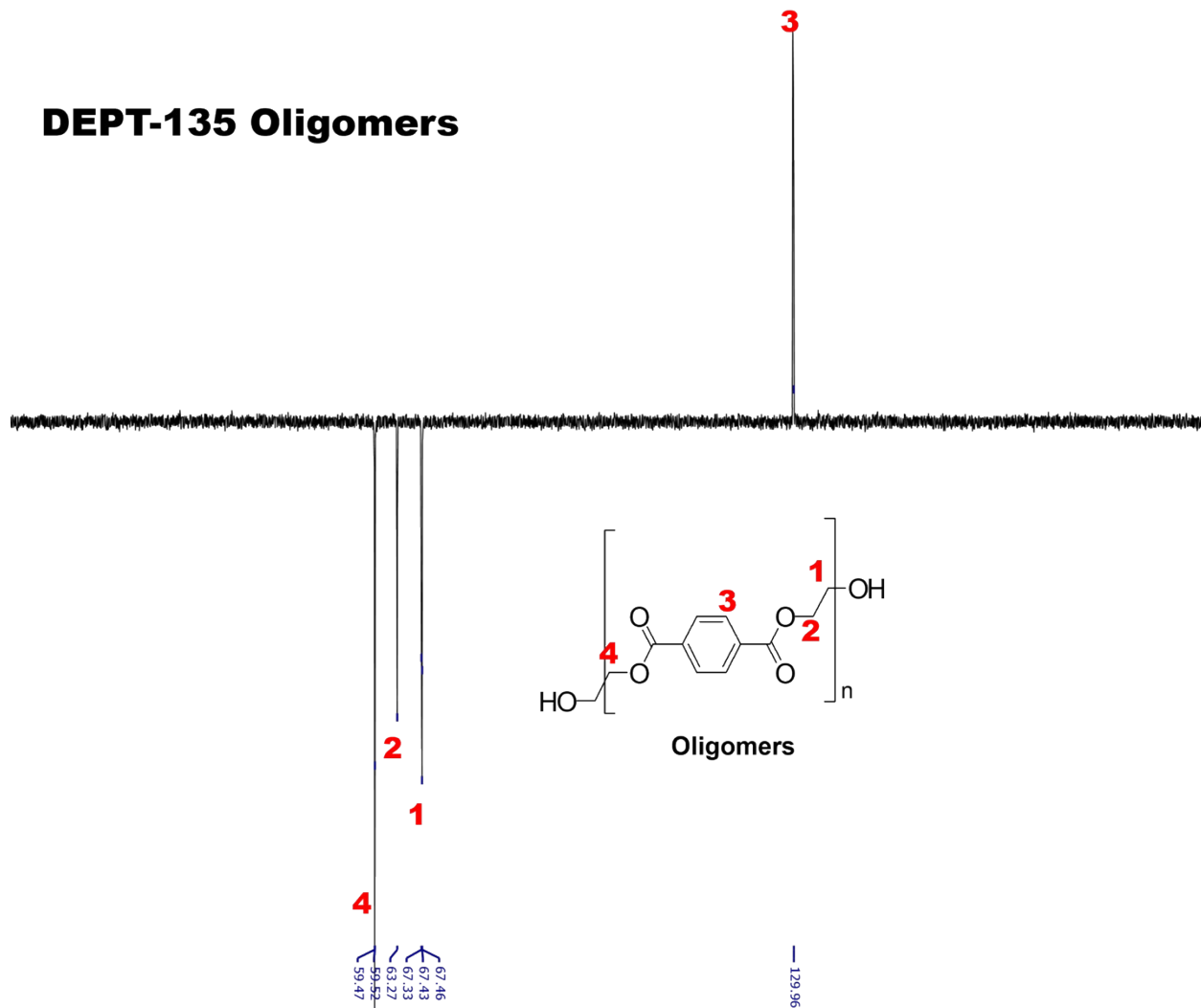


Fig. S7: DEPT 135 $^{\circ}$ NMR analysis of PET oligomers.

Cpd 1: C12 H14 O6; 0.425 277.0679: + FBF Spectrum (rt: 0.265-0.596 min) Oligomer.d  Subtract
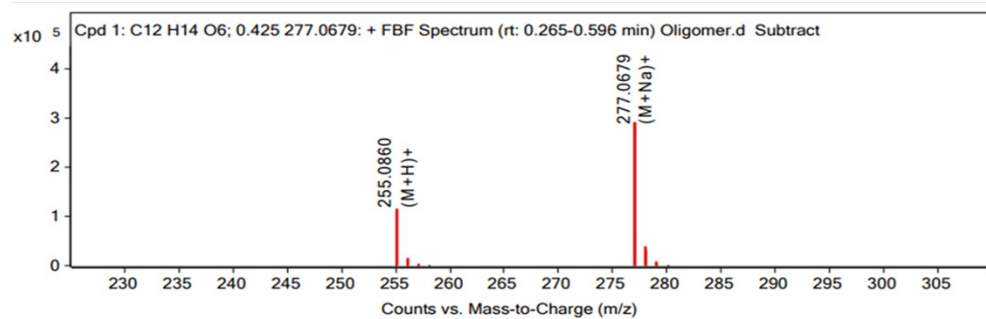
| Obs m/z | Charge | Abund | Ion/isotope |
| --- | --- | --- | --- |
| 255 | 1 | 114071 | (M+H)+ |
| 256 | 1 | 10762 | (M+H)+ |
| 257 | 1 | 1413 | (M+H)+ |
| 258 | 1 | 129 | (M+H)+ |
| 277 | 1 | 290022 | (M+Na)+ |
| 278 | 1 | 31581 | (M+Na)+ |
| 279 | 1 | 3446 | (M+Na)+ |
| 280 | 1 | 300 | (M+Na)+ |

Fig. S8: HR-MS analysis of BHET monomer.

Table S1: Concentration of total acid sites (estimated by NH$_3$-TPD analysis) in various metal oxides.

| S. No. | Catalyst | Concentration of total acid sites (mmol/g) |
|--------|----------|--------------------------------------------|
| 1 | Fresh MnO$_x$-500 nanorod catalyst | 0.440 |
| 2 | Spent MnO$_x$-500 nanorod catalyst | 0.320 |
| 3 | MnO$_x$-500 nanosphere catalyst | 0.368 |
| 4 | Commercial MnO$_2$ | 0.225 |
| 5 | CeO$_2$-500 | 0.103 |
| 6 | TiO$_2$-500 | 0.385 |
| 7 | Nb$_2$O$_5$-500 | 0.416 |