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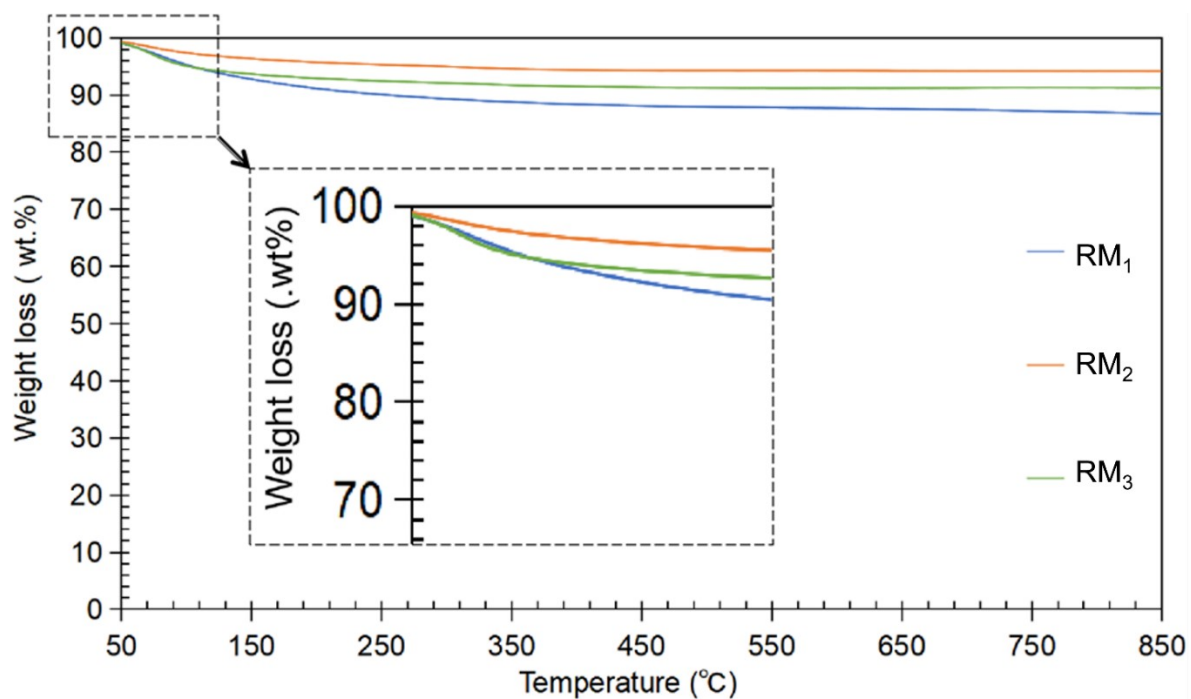


Fig. S1. TGA of fresh red mud (RM_x).

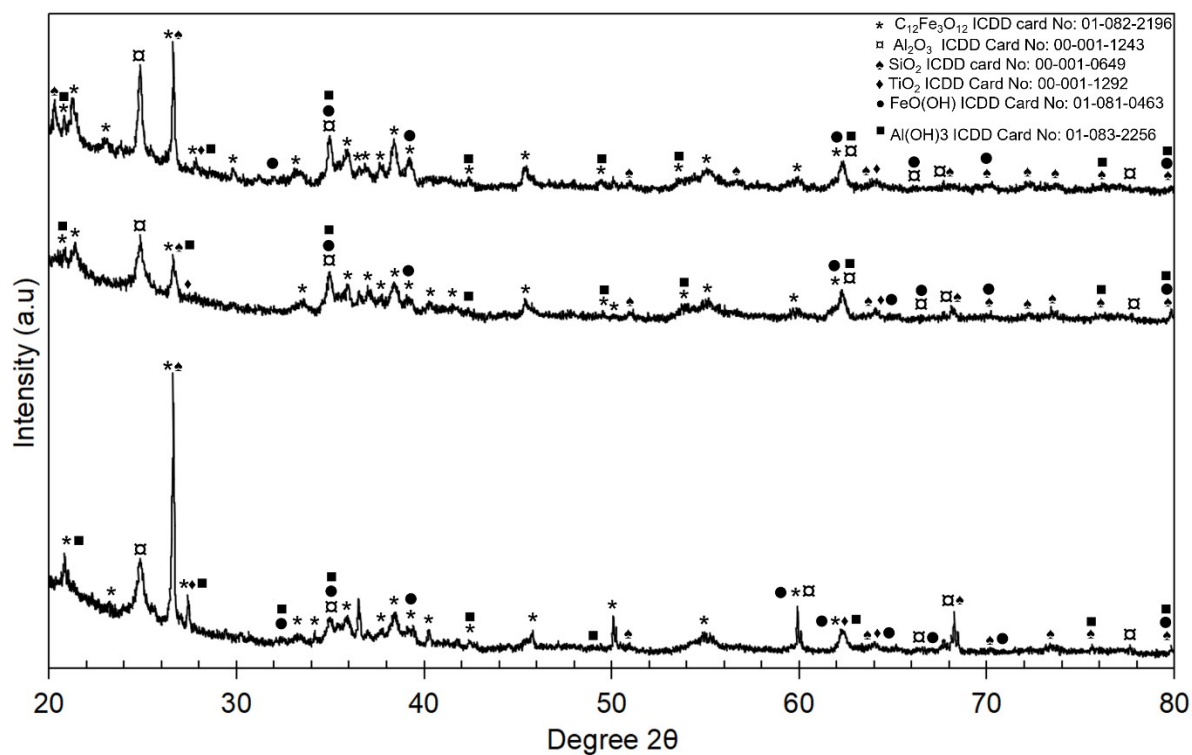


Fig. S2. XRD diffractogram of fresh red mud (RM_x).

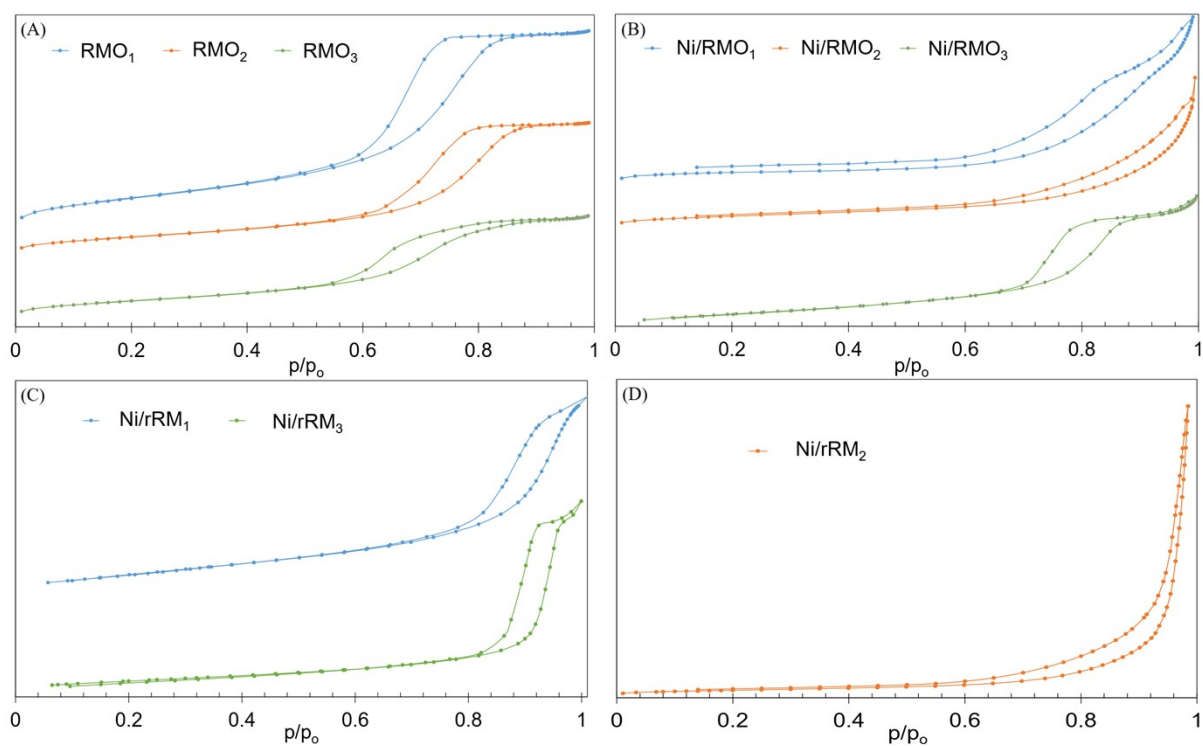


Fig. S3. N_2 adsorption-desorption isotherms of (A) RMO_x , (B) Ni/RMO_x , (C) Ni/rRM_1 and Ni/rRM_3 and (D) Ni/rRM_2 catalysts.

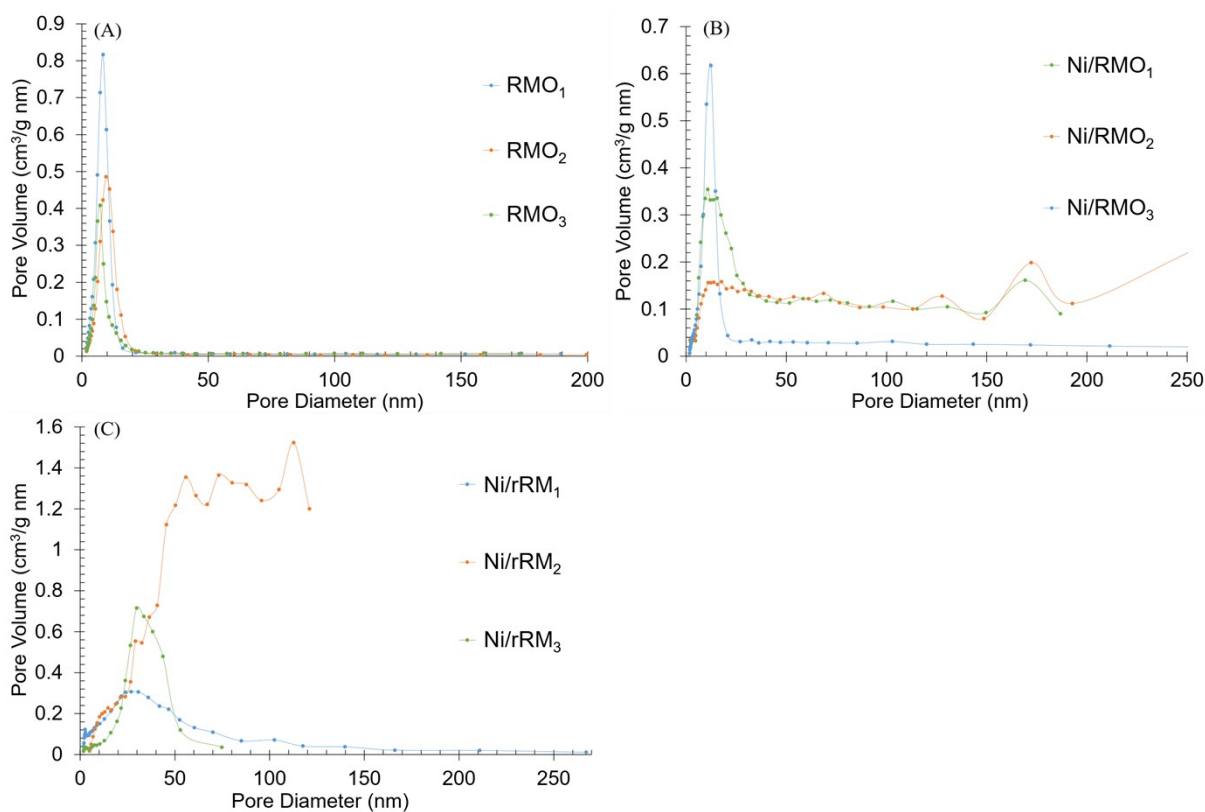


Fig. S4. Pore size distribution (BJH) curves of (A) RMO_x , (B) Ni/RMO_x and (C)

Ni/rRM_x catalysts.

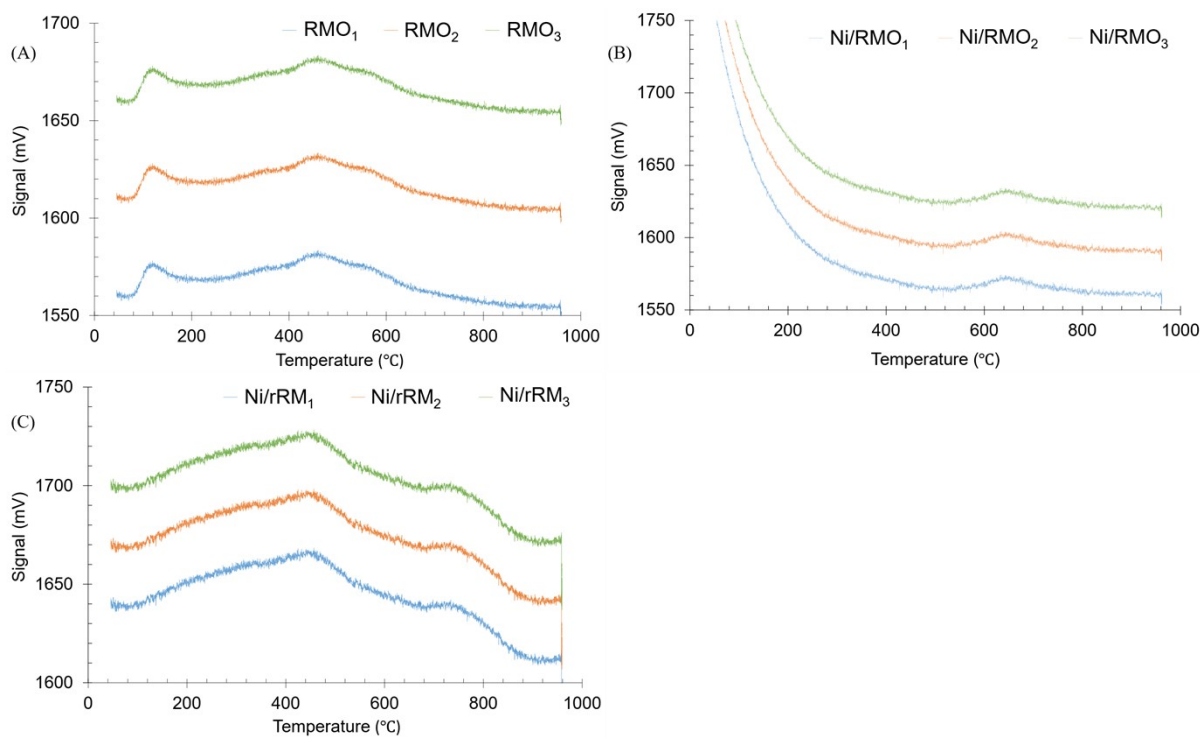


Fig. S5. TPD- NH_3 peak of (A) RMO_x , (B) Ni/RMO_x and (C) Ni/rRM_x catalysts.

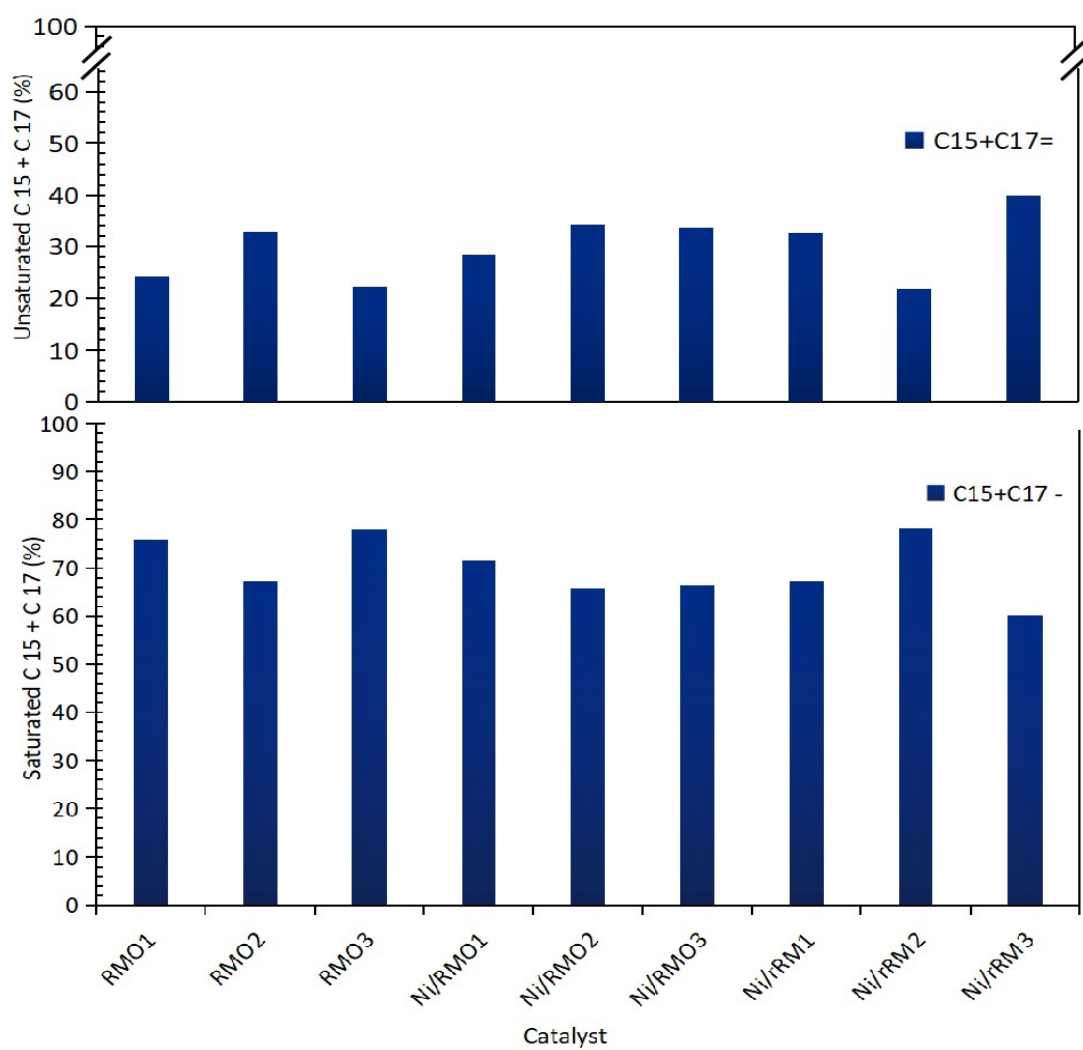


Fig. S6. Alkanes and alkenes n -($C_{15} + C_{17}$) distribution for RMO_x , Ni/RMO_x and Ni/rRM_x catalysed DO reaction. Reaction condition: $T = 350\text{ }^\circ\text{C}$, 2 h reaction time, 3 wt.% of catalyst loading.

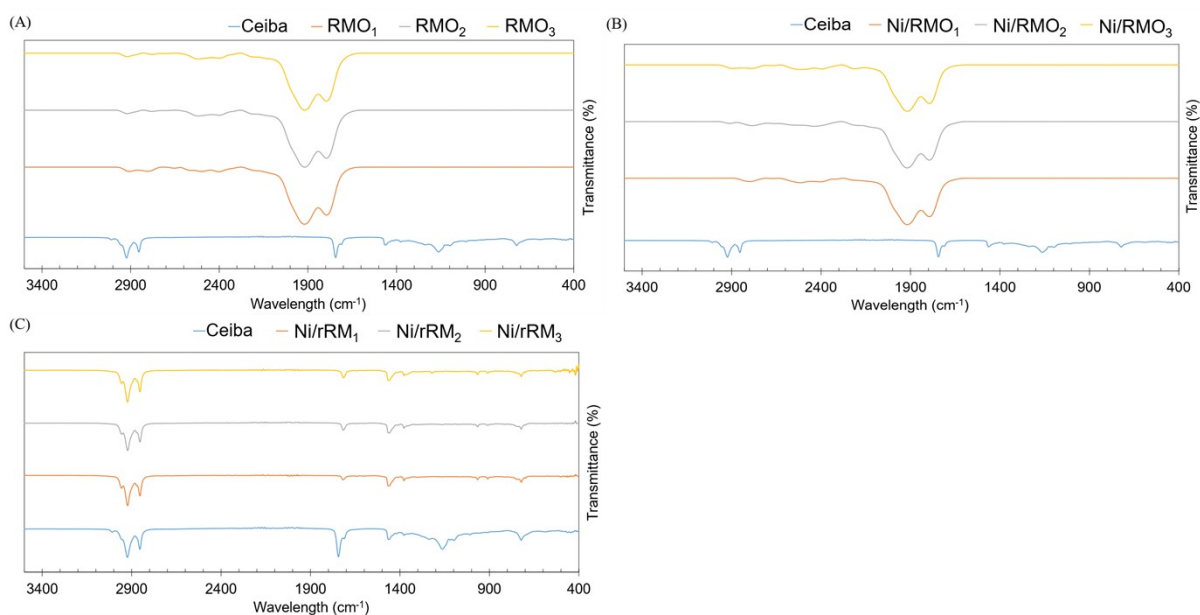


Fig. S7 FTIR spectra of deoxygenated liquid product catalysed by (A) RMO_x , (B) Ni/RMO_x and (C) Ni/rRM_x catalysts

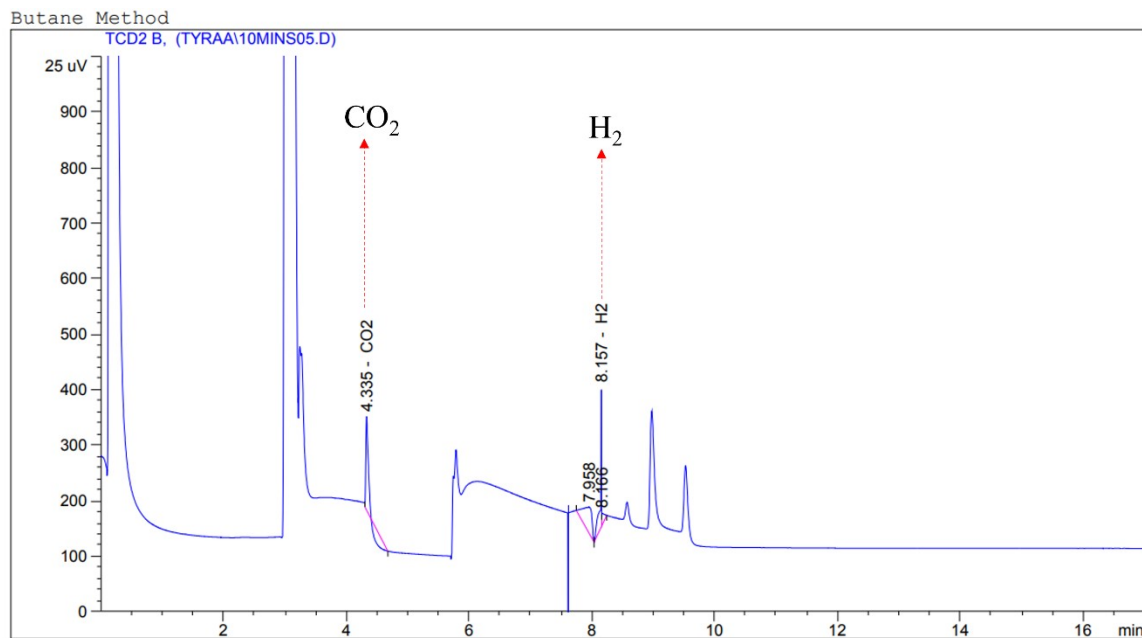


Fig. S8. Gas analysis for Ni/RMO_3 catalysed DO. Operating parameter: $T = 350\text{ }^\circ\text{C}$, 2 h reaction time, 3 wt.% of catalyst loading.