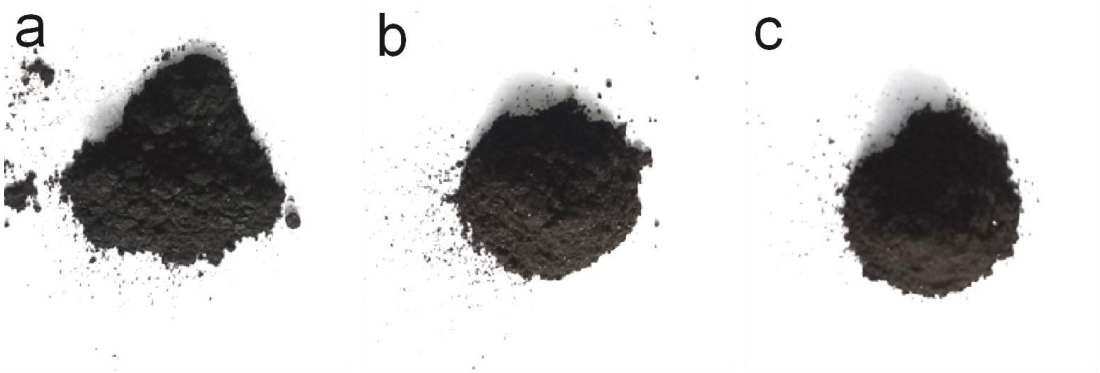


Figure S1. Photos of (a) L-coal, (b) H-coal, (c) Y-coal.

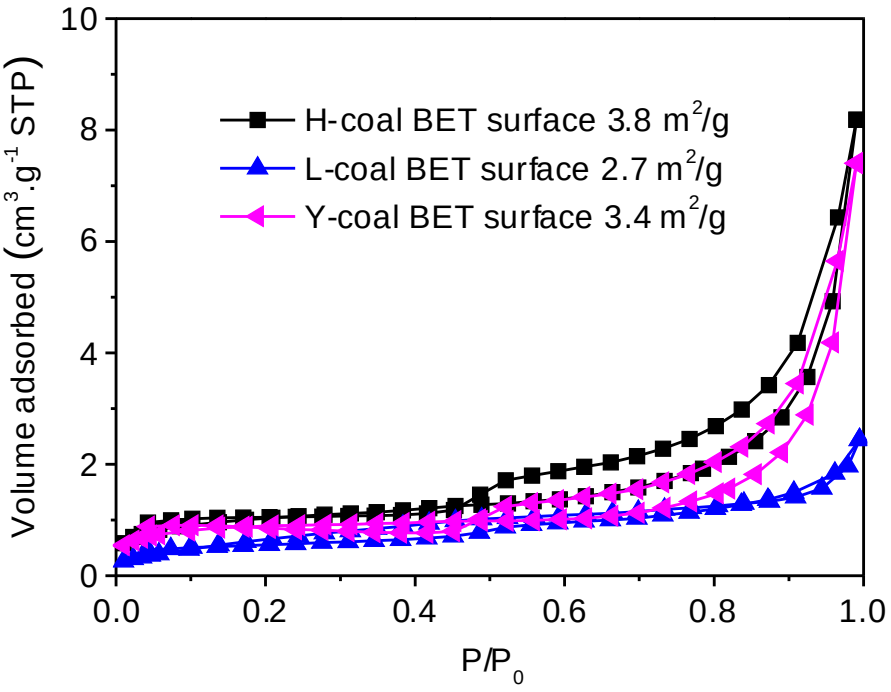


Figure S2. N_2 adsorption–desorption isothermal curve of various coal powders.

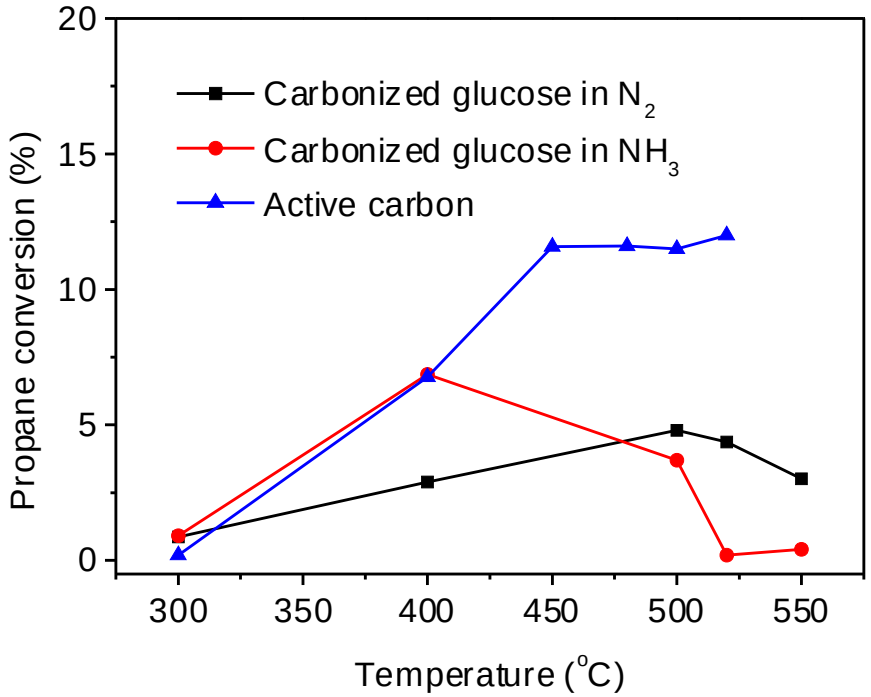
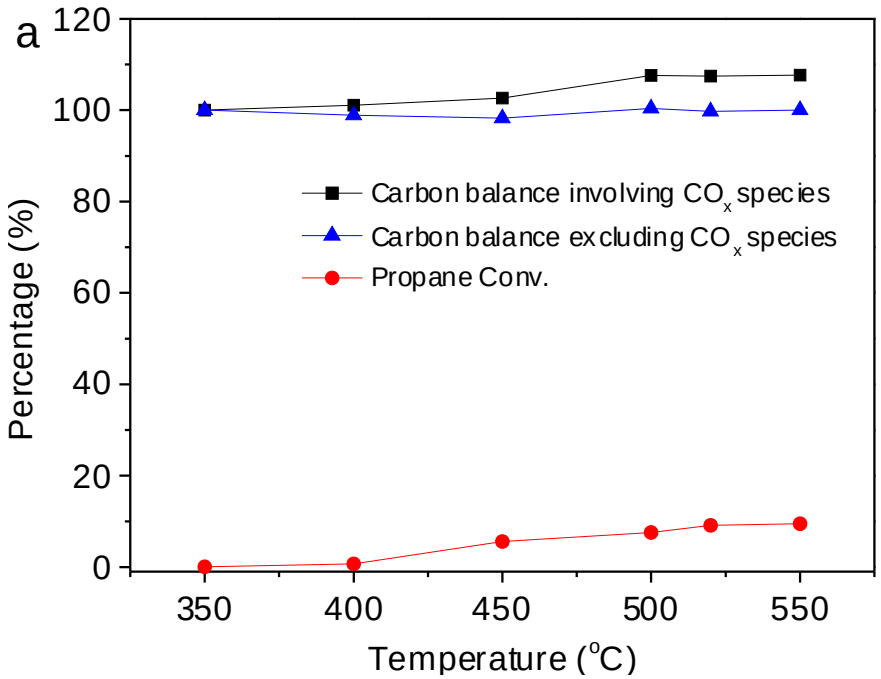


Figure S3. Propane conversion of active carbon, glucose carbonized in N_2 or NH_3. Reaction conditions: 15 kPa O_2, 30 kPa C_3H_8, N_2 balance, 20 mL·min^{-1}.



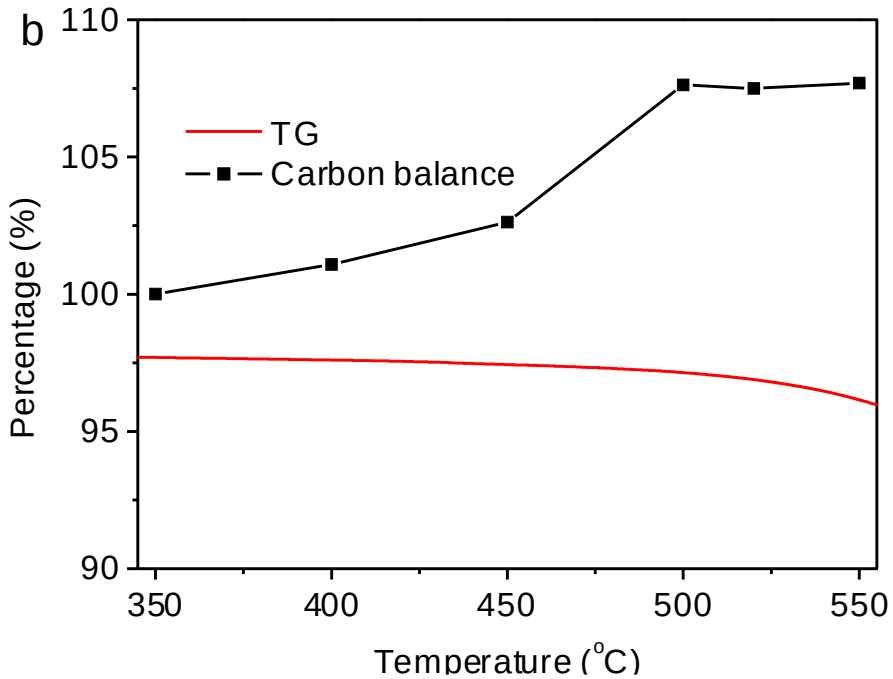


Figure S4. (a) The conversion of the oxidative dehydrogenation of propane for L-coal and the carbon balance when excluding and involving CO_x in the calculation. (b) Comparison between the carbon balance involving CO_x and TG result in the temperature range 350 to 550 ºC. Reaction conditions: 15 kPa O_2, 30 kPa C_3H_8, N_2 balance, mass space velocity 4000 mL·(h·g-cat)$^{-1}$, 0.3 g catalyst.

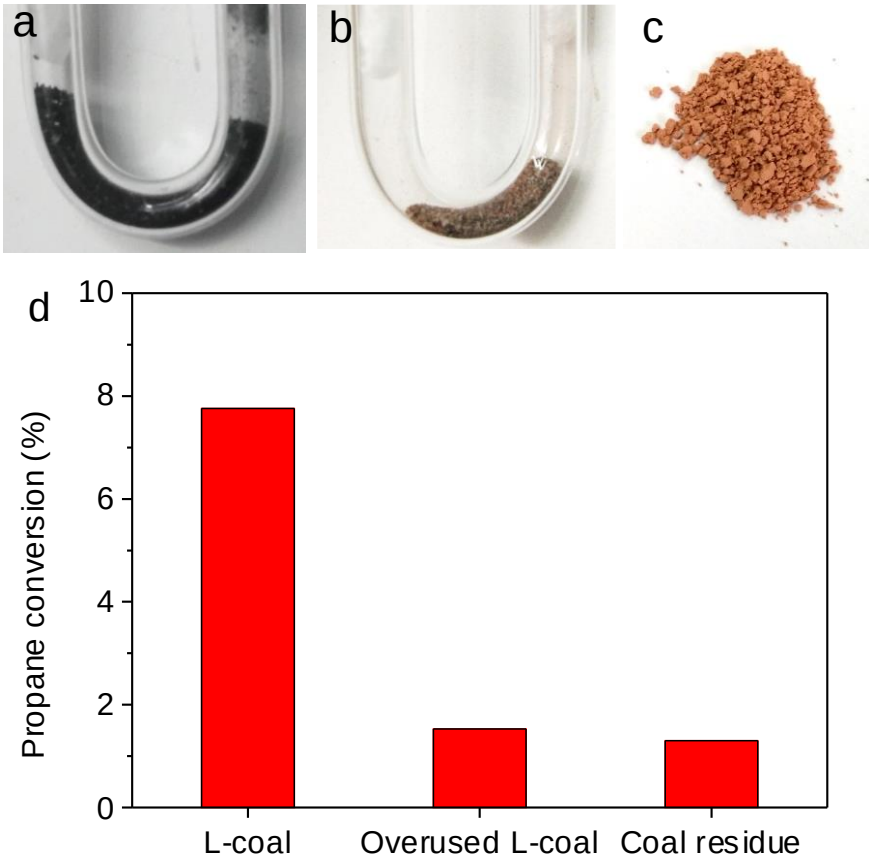


Figure S5. Photos of (a) used L-coal, (b) overused L-coal and (c) coal residue. (d) The catalytic activity of L-coal, ooverused L-coal, and coal residue. Reaction conditions: 15 kPa O_2, 30 kPa C_3H_8, N_2 balance, mass space velocity 4000 $mL\cdot(h\cdot g\text{-}cat)^{-1}$. L-coal powder after burning out at 700 °C for 2 h under air atmosphere was marked as coal residue. L-coal powder after reaction under 30 kPa P_{O_2} was named as overused L-coal powder.

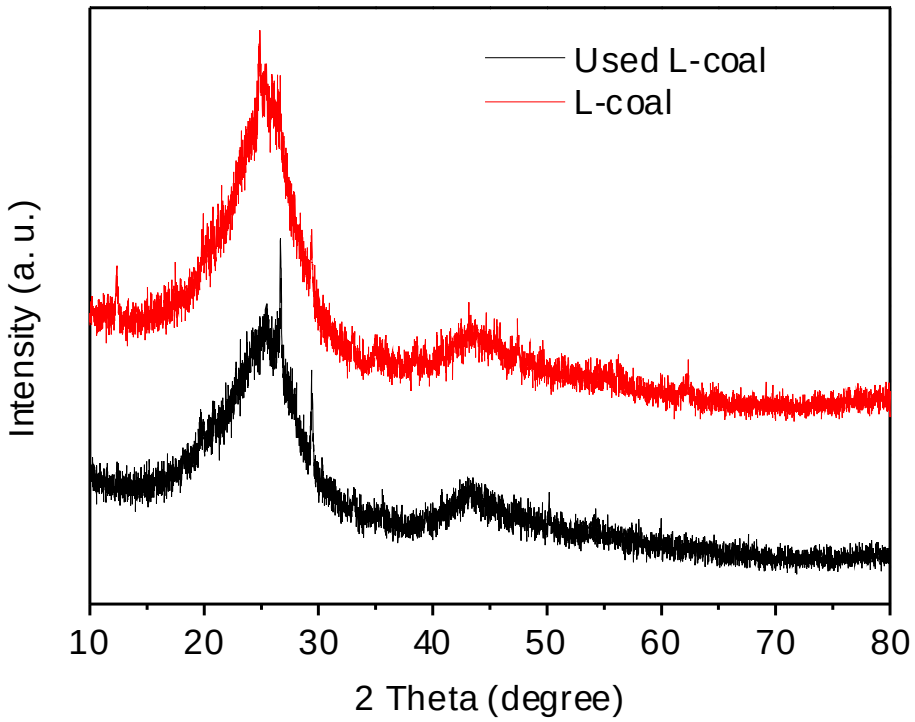


Figure S6. XRD patterns of L-coal and used L-coal.

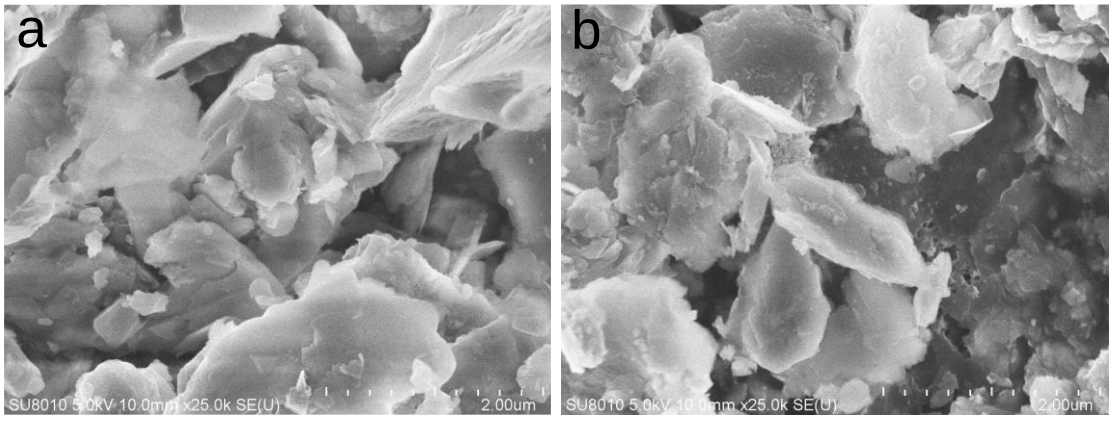


Figure S7. SEM images of (a) L-coal powder and (b) used L-coal powder.

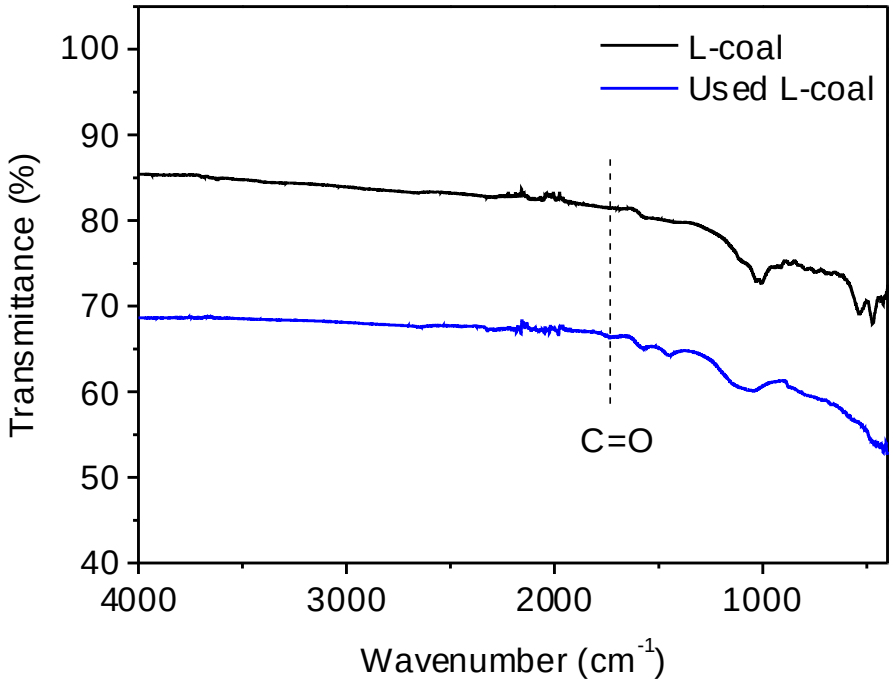


Figure S8. IR spectra of L-coal and used L-coal.