Supplementary Materials

Nanocrystalline Rhenium-doped TiO_2: an efficient catalyst in the one-pot conversion of carbohydrates to levulinic acid. The synergistic effect between Brønsted and Lewis acid sites

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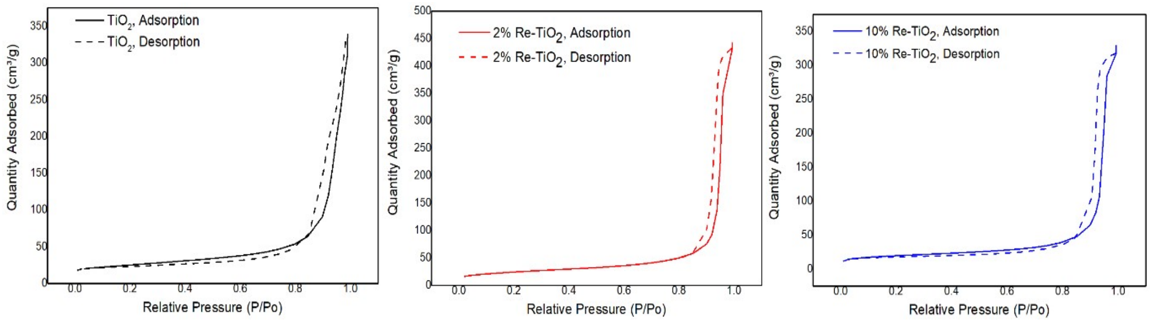

Fig. S1. Nitrogen adsorption and desorption isotherms for 0%Re-TiO_2, 2% Re- TiO_2 and 10% Re-TiO_2

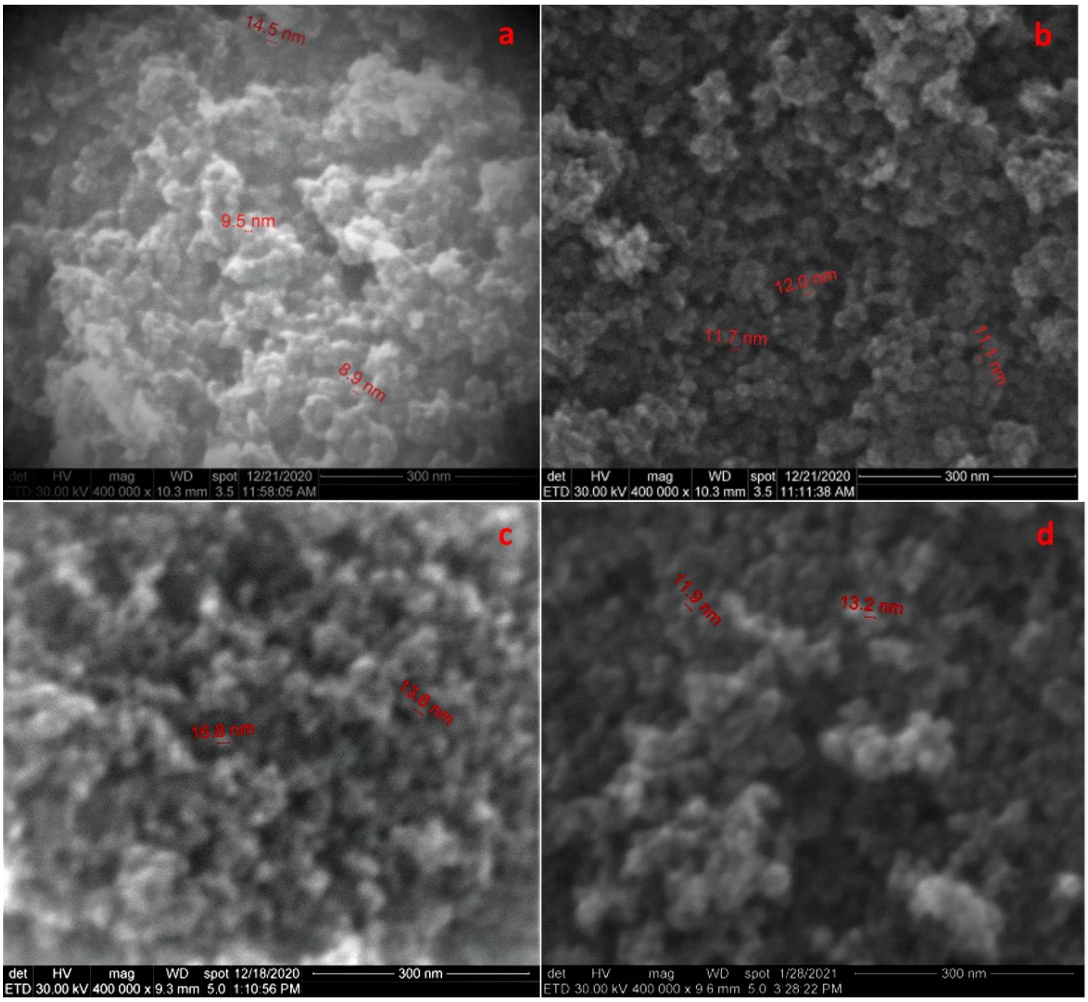

Fig. S2. Scanning electron microscopy (SEM) images of a) undoped TiO_2 nanoparticles (fresh), b) 2% Re- doped TiO_2 nanoparticles (fresh) c) 10% Re-doped TiO_2 nanoparticles (fresh) and d) 10% Re-doped TiO_2 nanoparticles (spent).

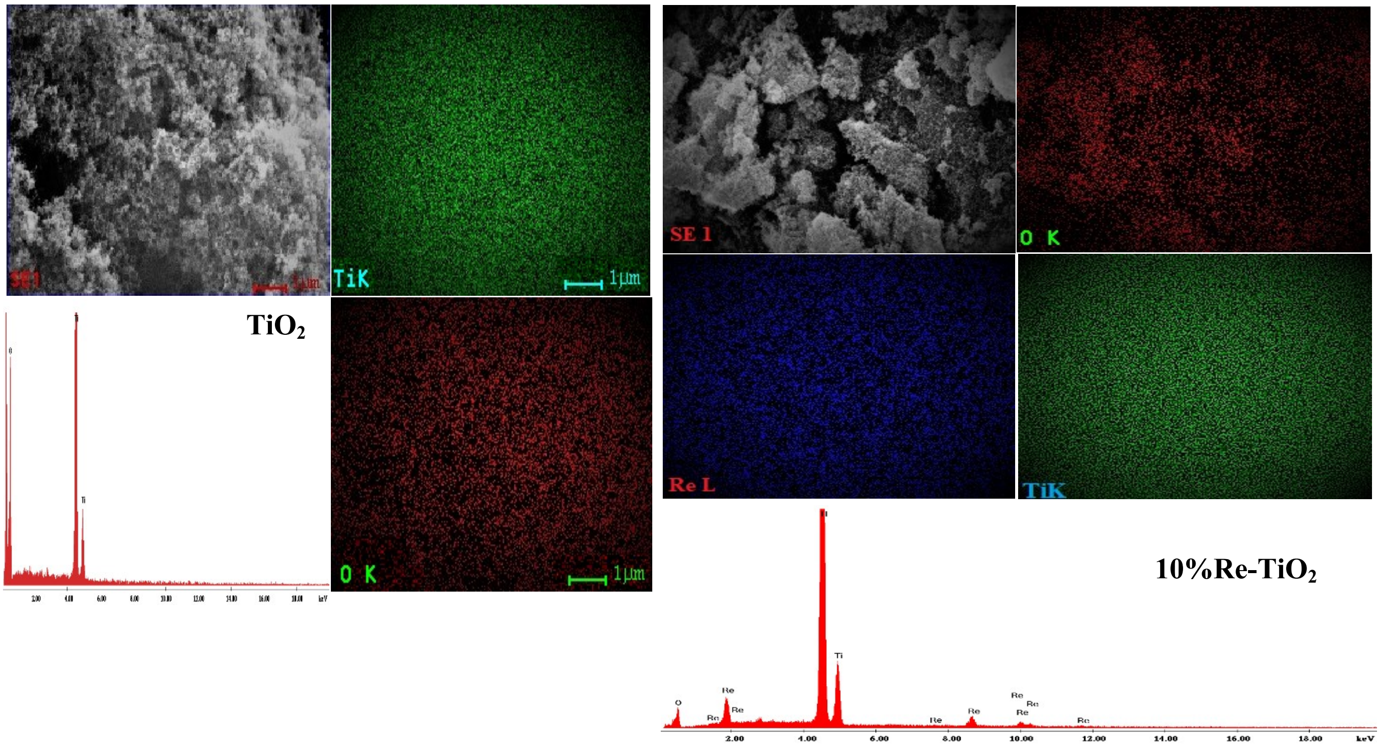

Fig. S3. Elemental mapping of Ti, O and Re for TiO_2 and 10%Re-TiO_2 taken from the area of the SEM shown in the inset of figure (SE1)

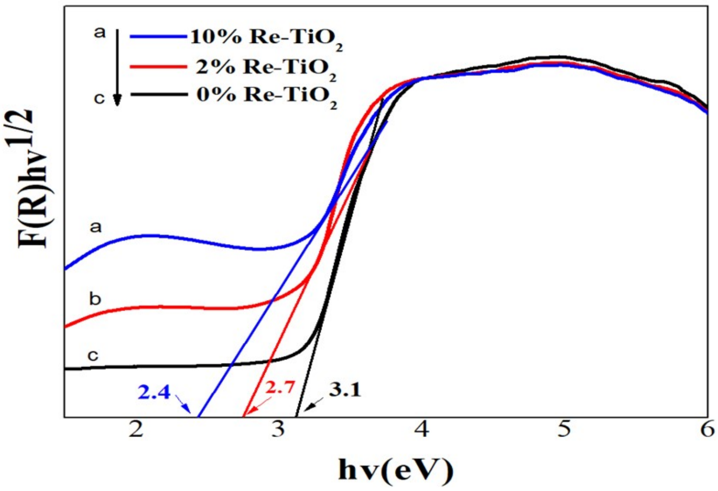

Fig. S4. Determination of band gaps for 10% Re-TiO_2 (a), 2%Re-TiO_2 (b) and 0%Re-TiO_2 (c)

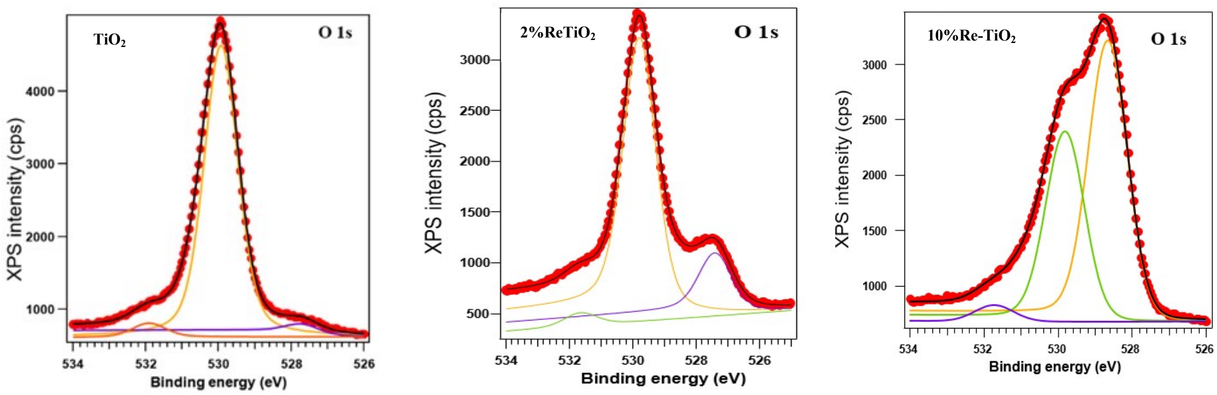

Fig. S5. XPS spectra of O1s for: 0%Re-TiO_2; 2%Re-TiO_2 and 10% Re-TiO_2

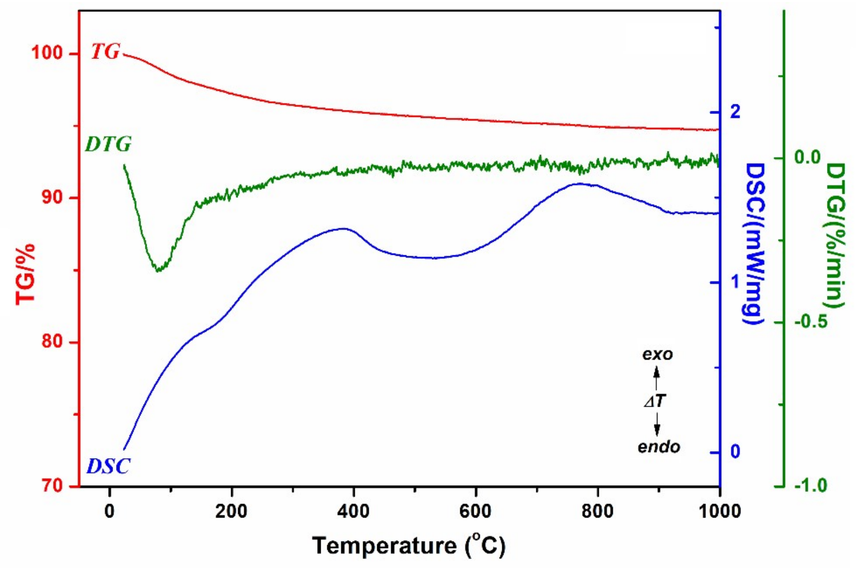

Fig. S6. Thermal curves (TG, DTG, and DSC) of undoped TiO_2

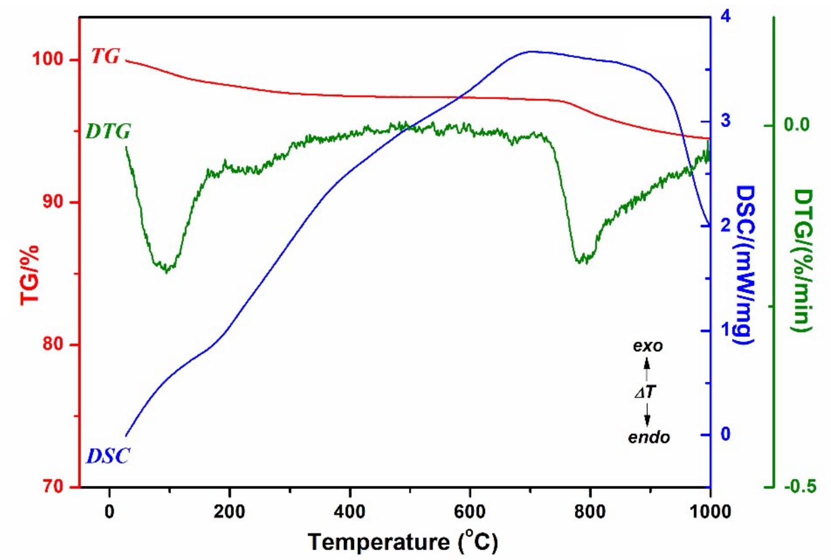

Fig. S7. Thermal curves (TG, DTG, and DSC) of the 2%Re-TiO_2 material

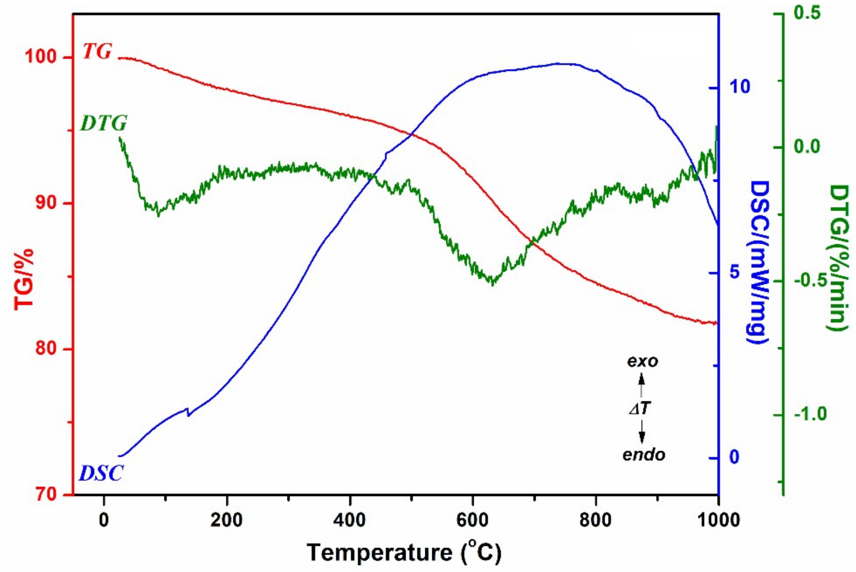

Fig. S8. Thermal curves (TG, DTG, and DSC) of the 10%Re-TiO_2 material

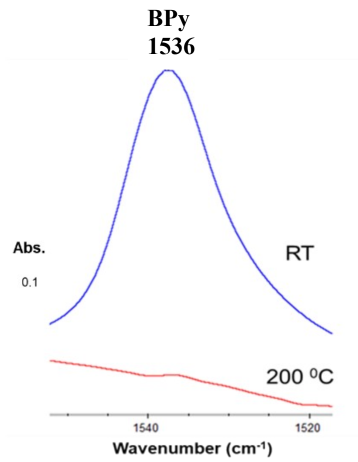

Fig. S9. In situ FTIR spectra for 10% Re-TiO_2 catalyst concerning desorption of pyridine at room temperature (RT) and 200 ^{0}C

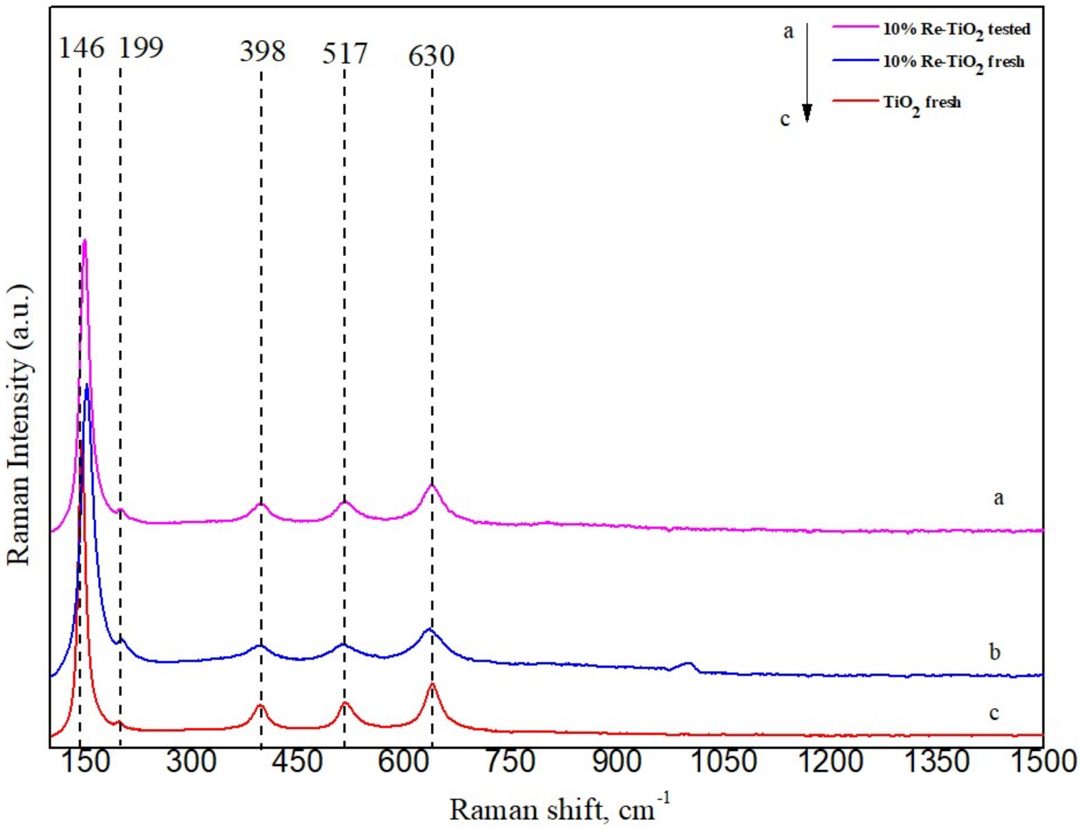

Fig. S10. Raman spectra for 10%Re-TiO_2 (tested at 210 ^0C) (a), 10%Re-TiO_2 (fresh) (b) and 0%Re-TiO_2 (fresh) (c)

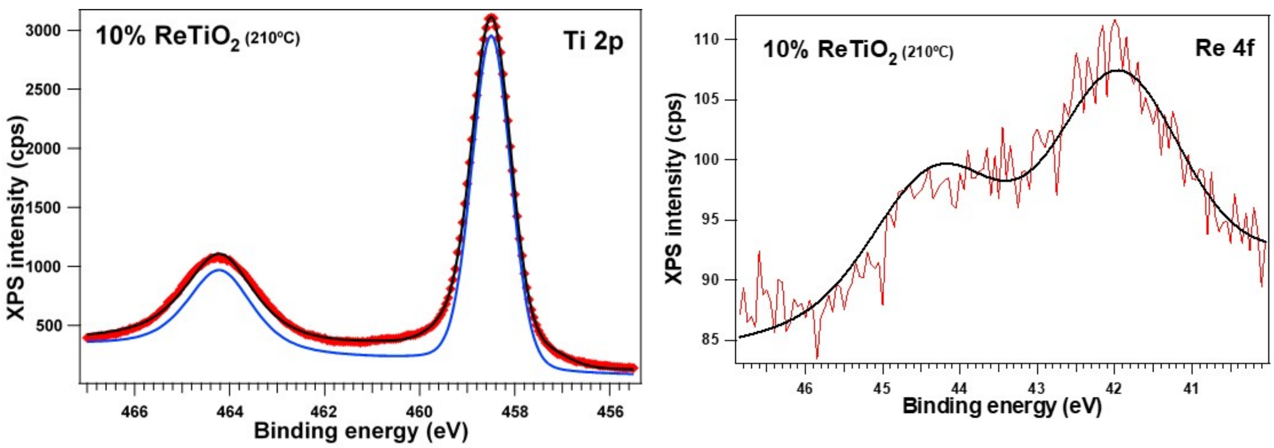

Fig. S11. XPS spectra of the Ti (2p) and Re (4f) level for 10%Re-TiO_2 tested at 210 ^0C