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Supporting information for the article:

Synthesis, characterization and testing of a new V_2O_5/Al_2O_3-MgO catalyst for butane dehydrogenation and limonene oxidation.

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This file includes the IR studies of the bare support, catalysts **A** and **B**, the XRD pattern of catalysts **A-C**, the EPR studies are presented for catalyst **A** and **B** at 298 K and for catalyst **A** at 20 K and 70 K as well as the reduced catalyst **A** at 298 K. We also include the TPR profile of vanadium pentoxide and the experimental procedure for performing the leaching tests.

1. IR Studies

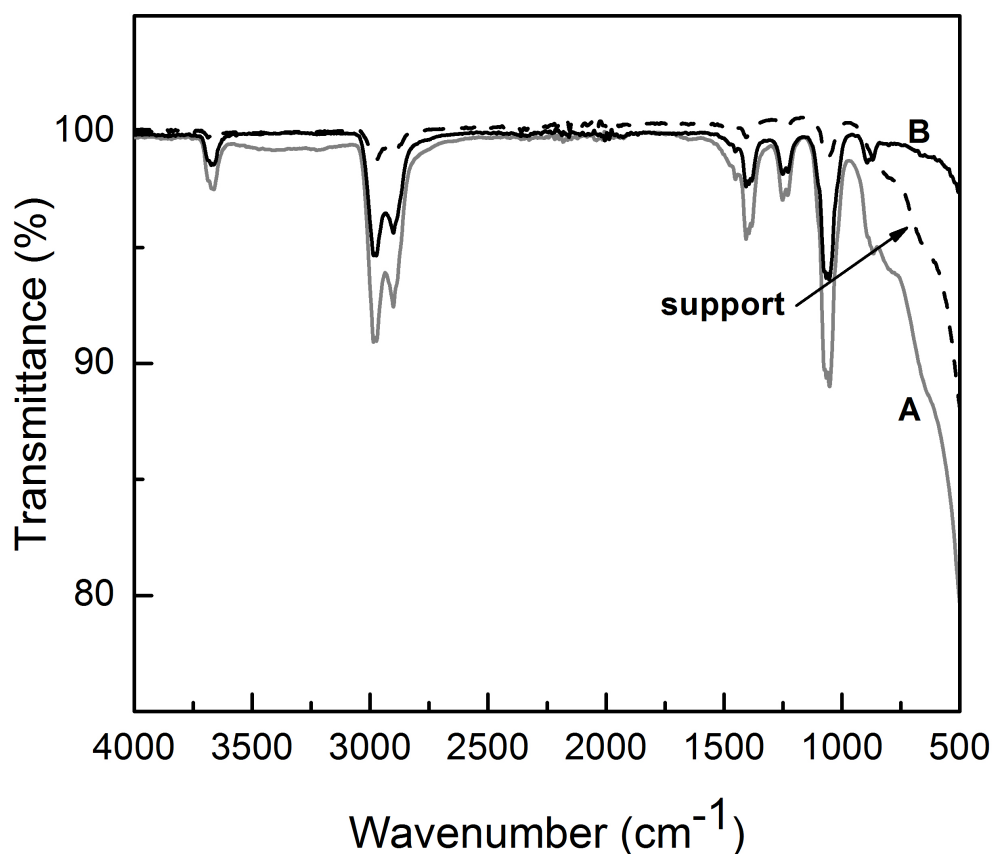


Figure S1: IR spectra of the support and the catalysts **A** and **B**.

2. XRD studies

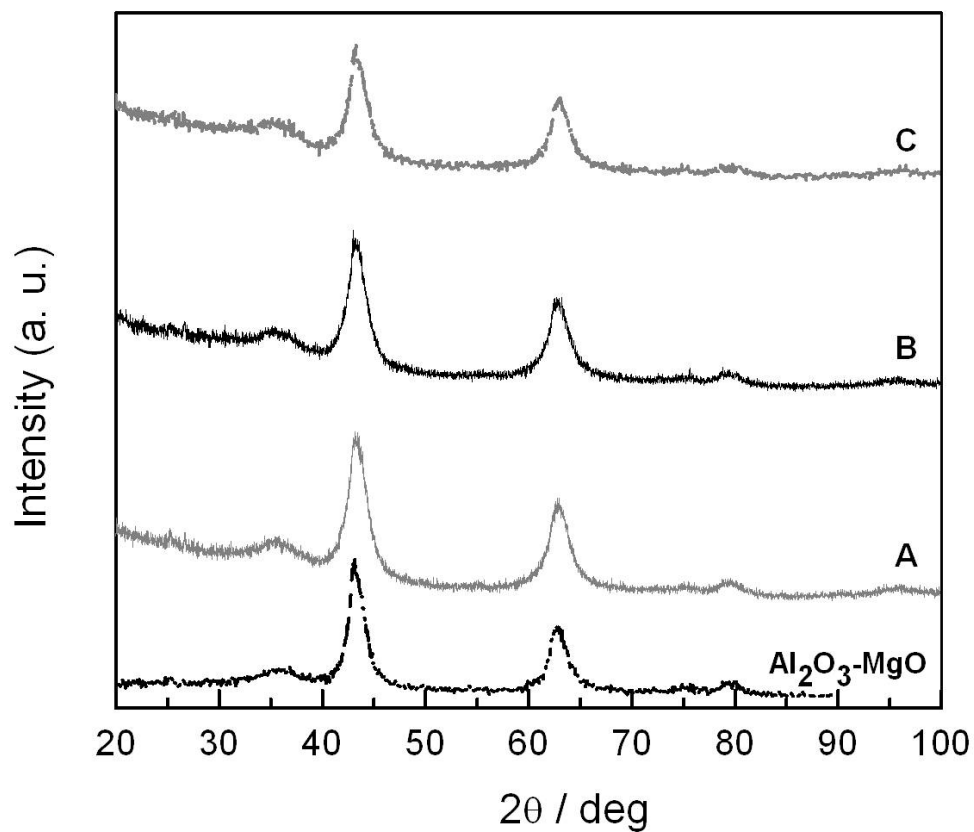


Figure S2: X-ray diffraction patterns of catalysts A-C

Al₂O₃- MgO: XRD pattern for the bare support

A) XRD pattern for catalyst **A**: 5 wt% V₂O₅ on MgO–Al₂O₃ support

B) XRD pattern for catalyst **B**: 10 wt% V₂O₅ on MgO–Al₂O₃ support

C) XRD pattern for catalyst **C**: 15 wt% V₂O₅ on MgO–Al₂O₃ support

3. EPR studies

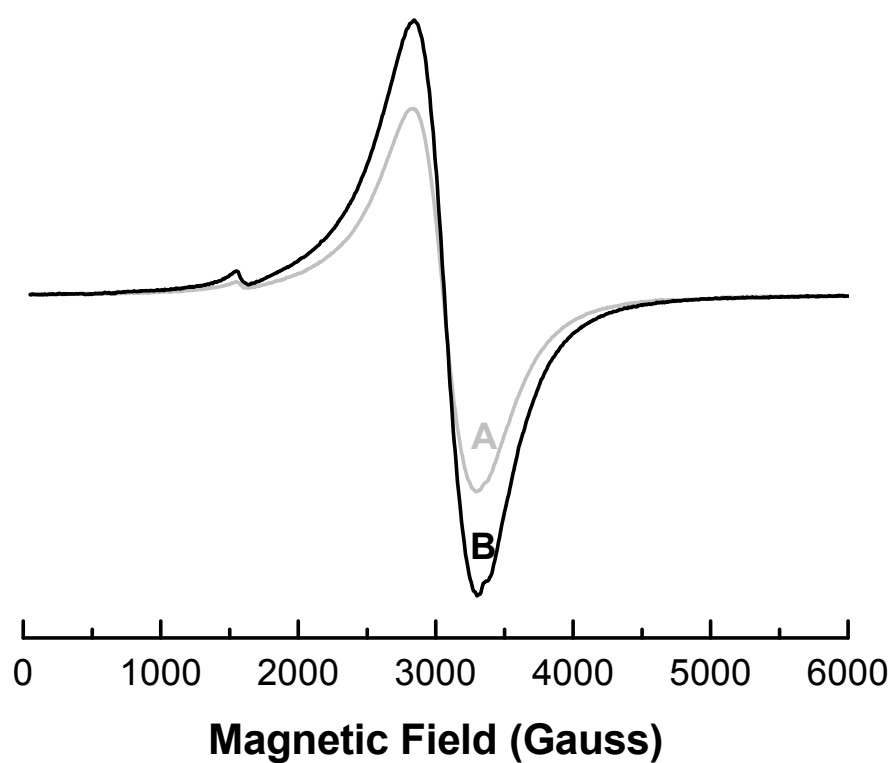


Figure S3: EPR spectra of catalysts **A** and **B** at 298 K.

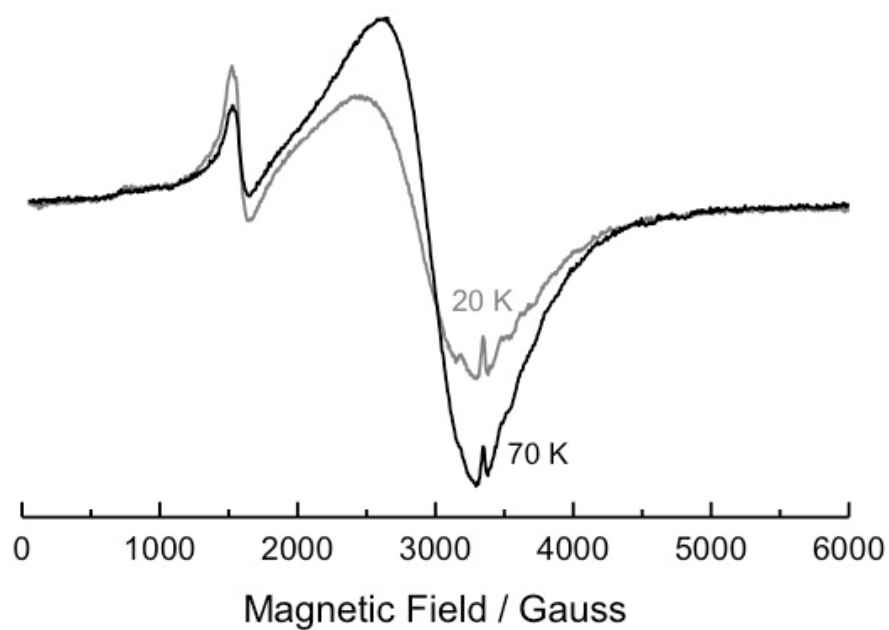


Figure S4: EPR spectra of catalyst **A** at 20 K and 70 K.

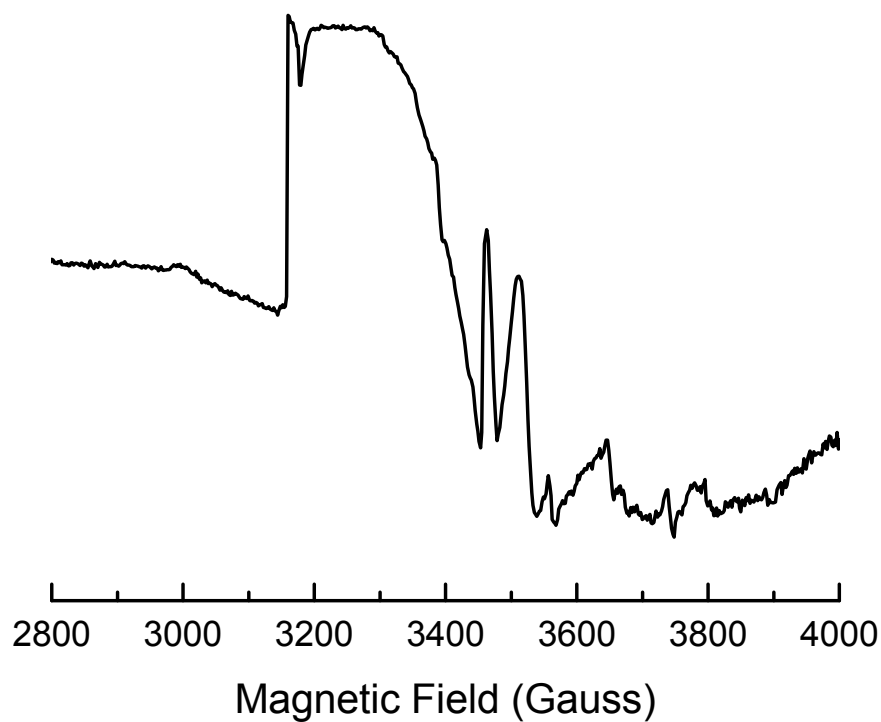


Figure S5: EPR spectrum of the reduced catalyst A recorded at 298 K, after keeping the catalyst two weeks at ambient conditions.

4. TPR measurements

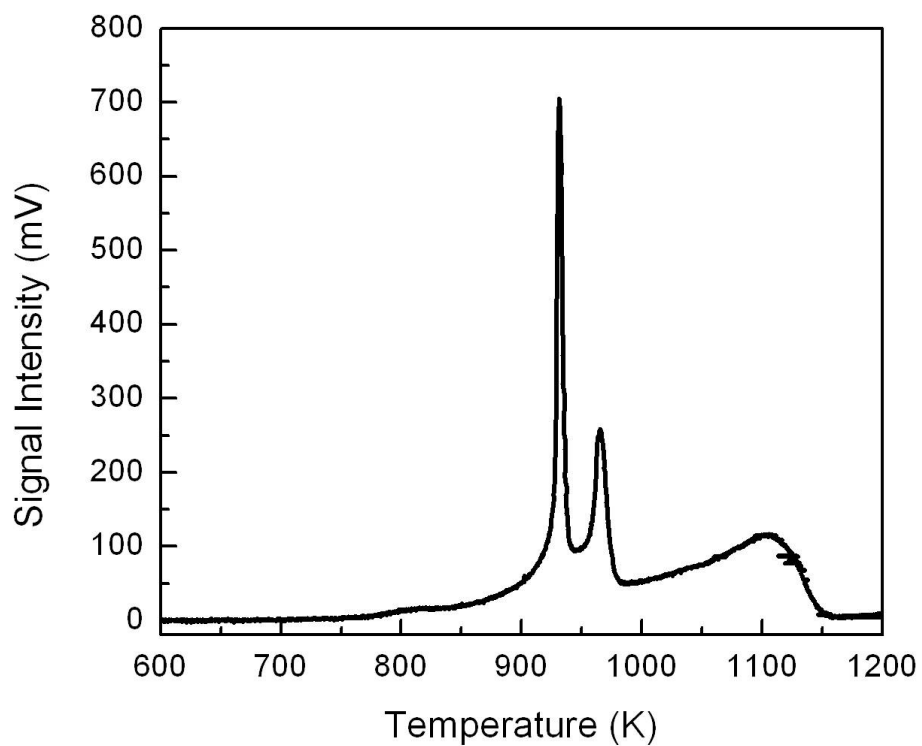


Figure S6: Temperature programmed reduction profile of V_2O_5

5. Leaching test

The reaction conditions are : 1.2 ml (6.2 mmol) limonene, 6.0 ml H₂O₂ (35.5, aq.; molar ratio 8:1 H₂O₂:limonene), 1.3 ml (12.4 mmol) benzonitrile; 0.025 g catalyst; 40 ml acetone:2-butanol (ratio 2:8), 65 °C, 6 h. The quantitative GC-analysis is performed using an external standard (anisole) calibration.

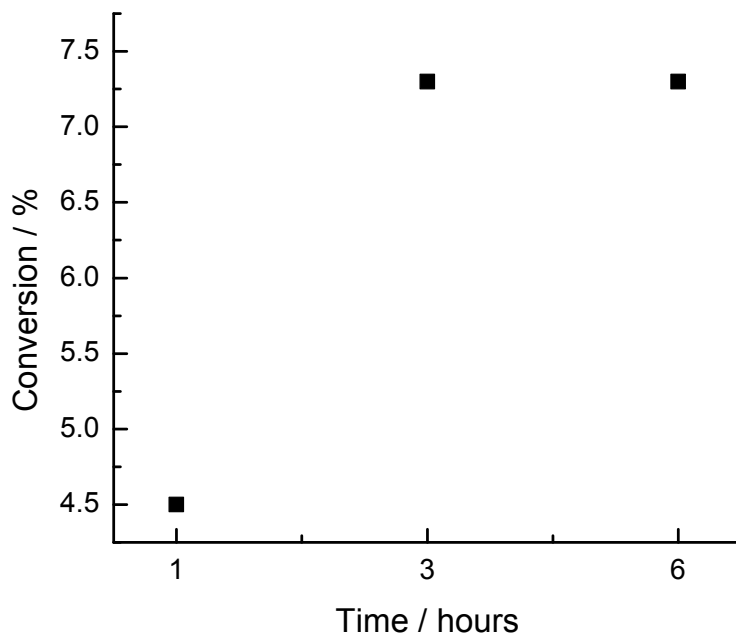


Figure S7: Leaching test of catalyst **B**. Catalyst is filtered off after 60 min reaction time.