Electric Supplementary Information

Dispersed Ru nanoclusters transformed from grafted trinuclear Ru complex on SiO_2 for selective alcohol oxidation

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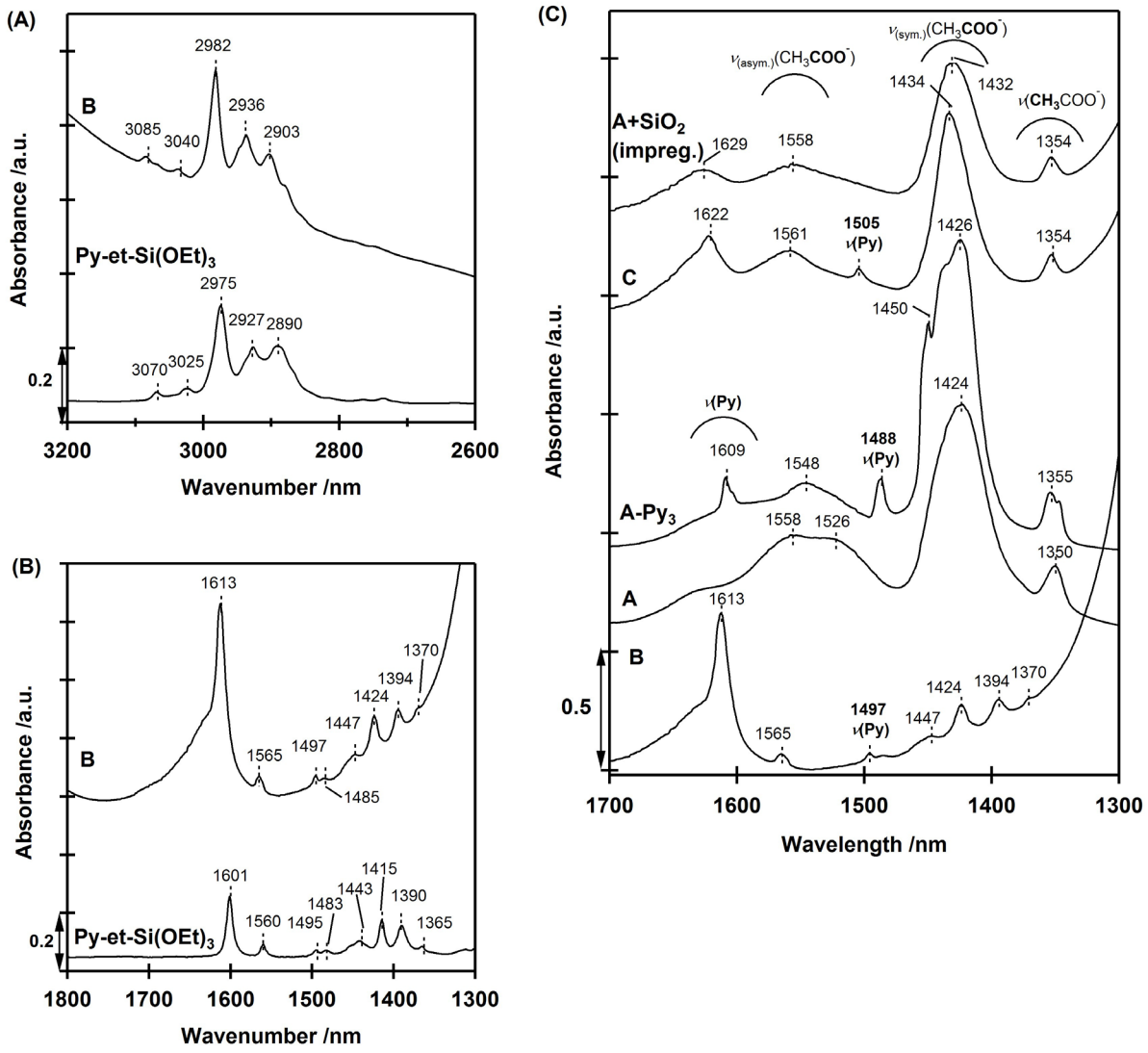

Fig. S1. (A, B) FT-IR spectra for Py-et-Si(OEt)$_3$ and **B** in (A) the vibration region and (B) in the ring-vibration and the rotation region. (C) FT-IR spectra for **A**, **A-Py$_3$**, **B**, **C**, and **A+SiO$_2$** (impregnated).

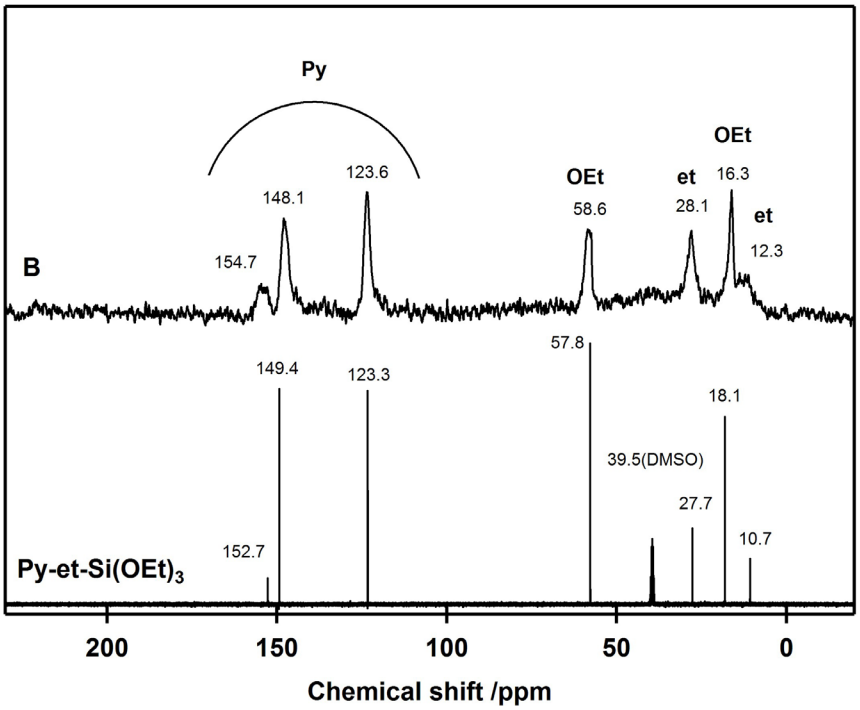

Fig. S2. ^{13}C liquid-state NMR of Py-et-Si(OEt)$_3$ (in DMSO-d_6) and ^{13}C SS MAS NMR of **B**.

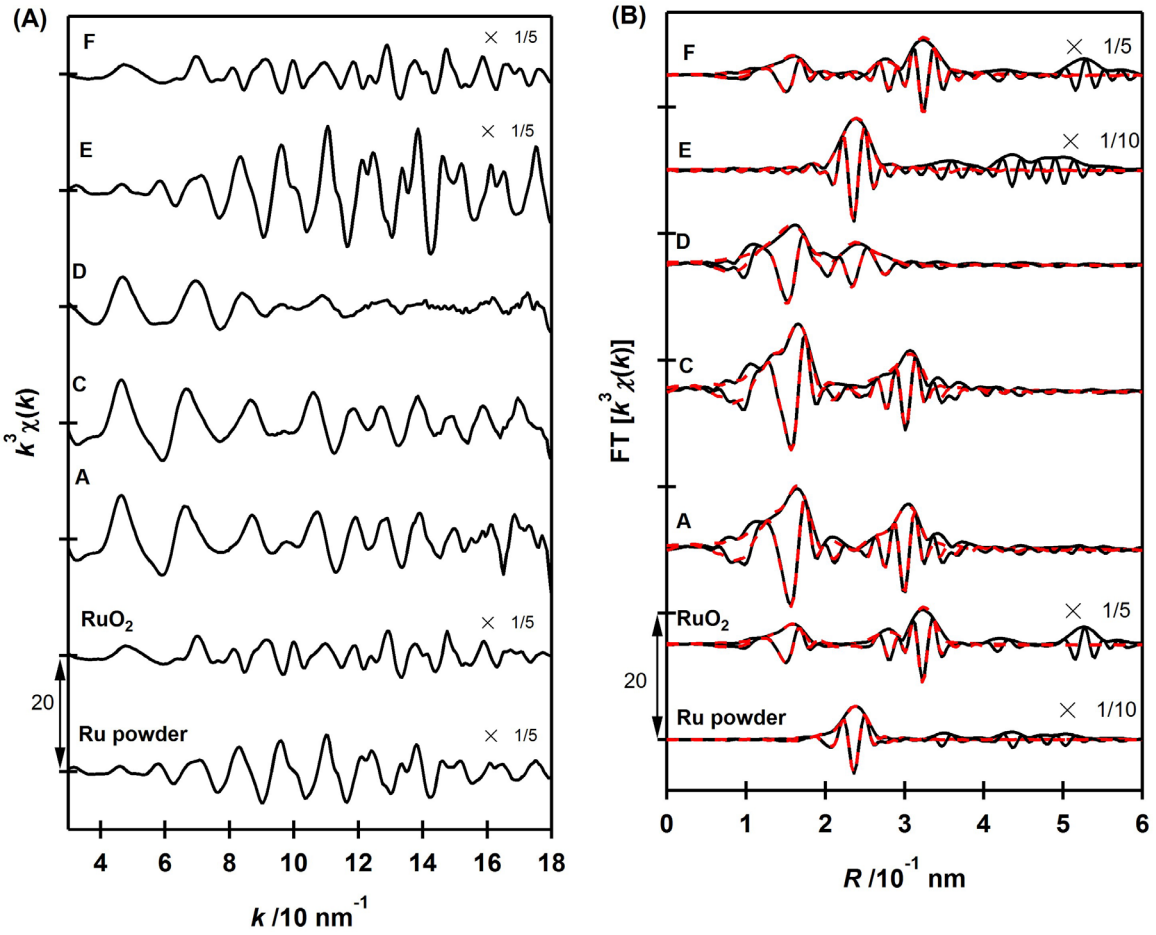

Fig. S3. (A) k^3-Weighted Ru K-edge EXAFS oscillations and (B) their Fourier transforms for Ru powder, RuO_2, **A**, **C**, **D**, **E**, and **F** (Ru: 3 wt%). Black solid lines in (B): observed data and red dashed lines: fitted data.

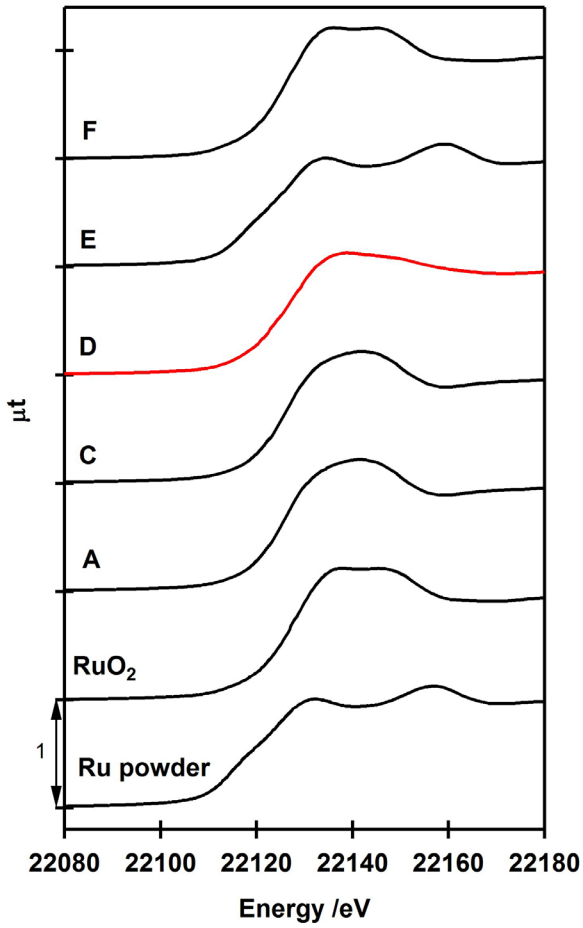

Fig. S4. Normalized Ru K-edge XANES spectra of Ru powder, RuO_2, **A**, **C**, **D**, **E**, and **F**.

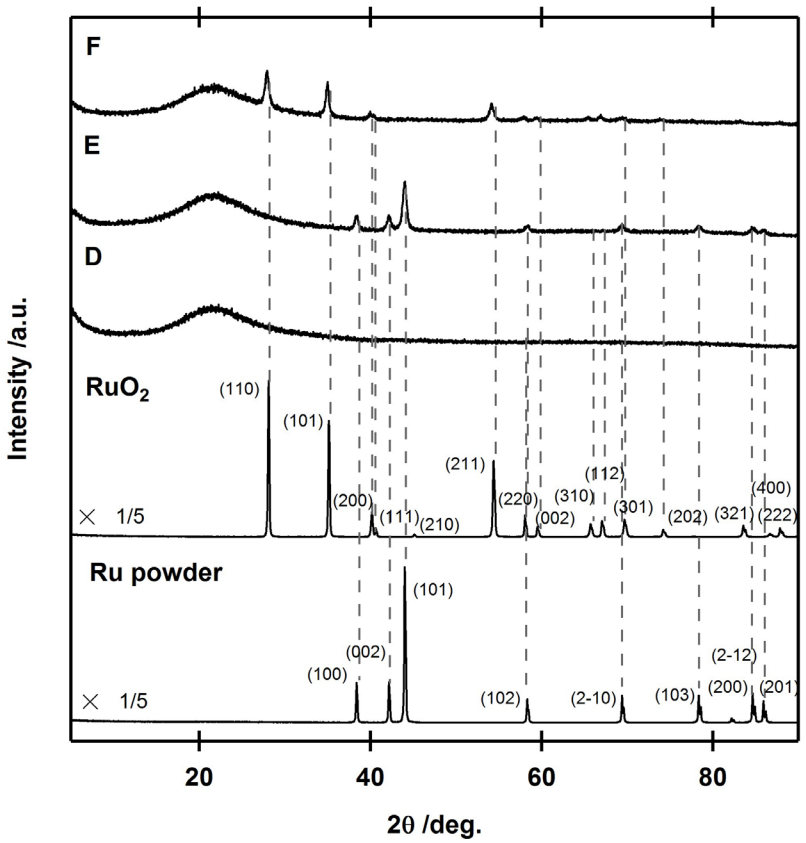

Fig. S5. XRD spectra of Ru powder, RuO_2, **D**, **E**, and **F** (Ru: 3 wt%).

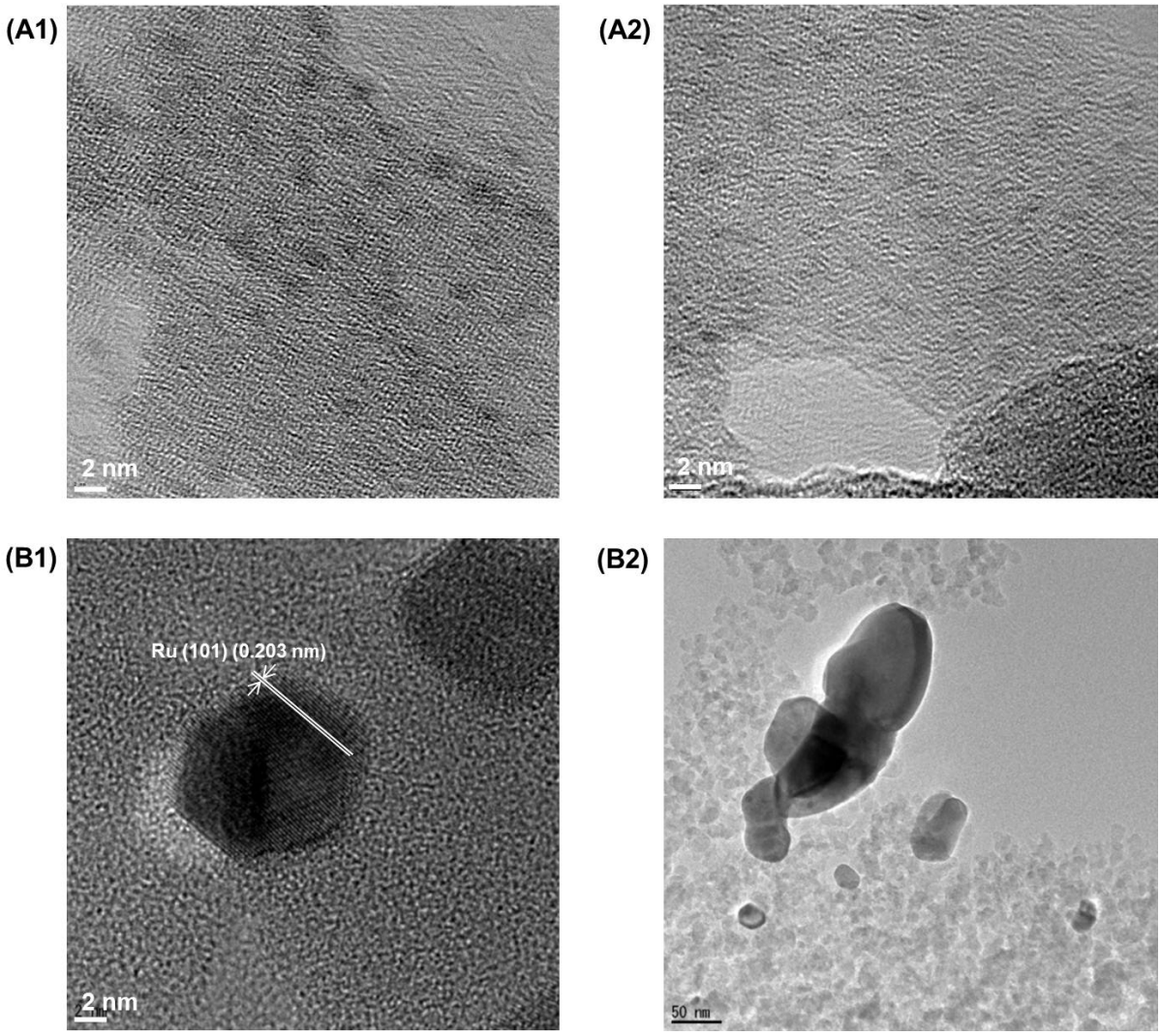

Fig. S6. TEM images of (A) **D** and (B) **E**.

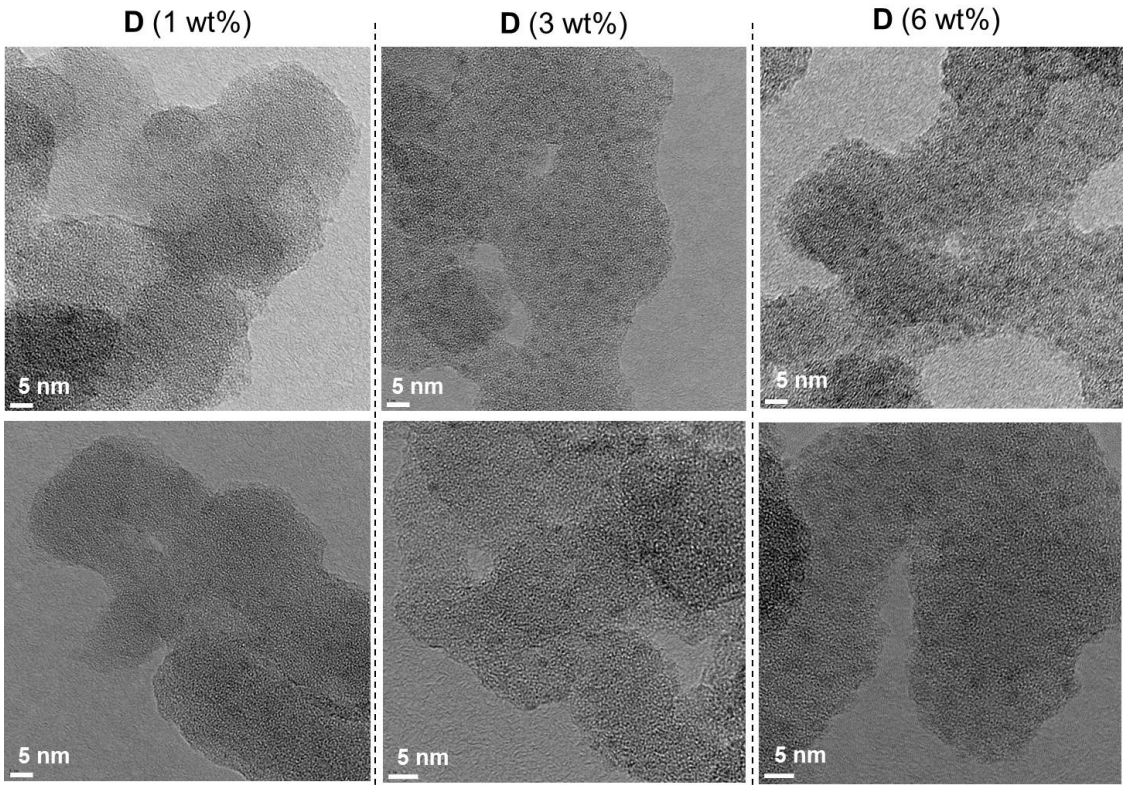

Fig. S7. TEM images of **D** (Ru: 1 wt%, 3 wt%, and 6 wt%).

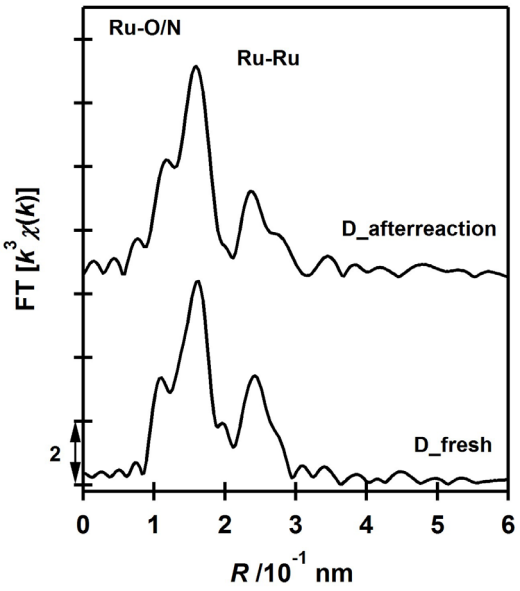

Fig. S8. k^3-Weighted Ru K-edge EXAFS Fourier transforms for **D** (fresh, Ru: 3 wt%) and **D** (after the benzyl alcohol oxidation, Ru: 3 wt%) measured at 20 K.

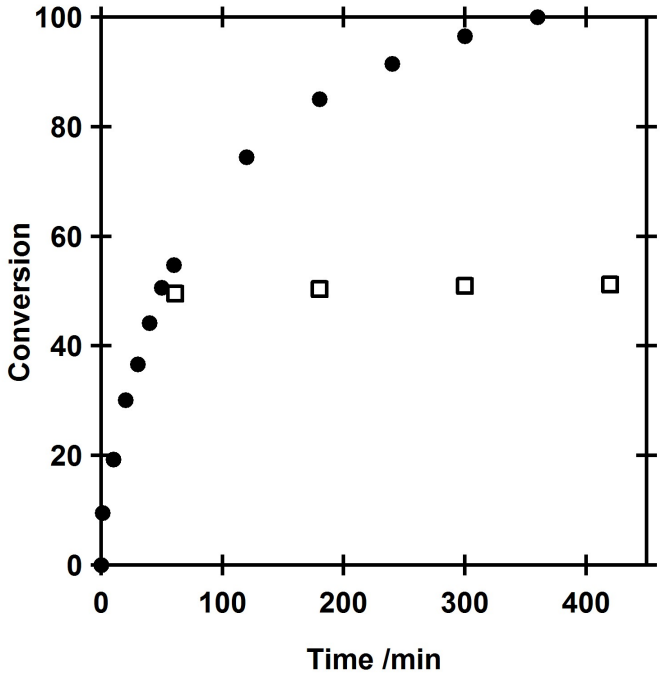

Fig. S9. Conversion – time plot for the selective oxidation of benzyl alcohol on **D** (●), and test of heterogeneous nature after the removal of solid part (□). Reaction conditions: Ru_3 = 1.0 × 10^{-5} mol, Ru_3/benzyl alcohol/dodecane (internal standard) = 1/100/50 (molar ratio), 0.33 mol L^{-1} of benzyl alcohol in toluene, 353 K, 101.3 kPa of O_2, 6 h.