Electronic Supporting Information (ESI)

Silica/MAO/(n-BuCp)$_2$ZrCl$_2$ Catalyst: Effect of Support Dehydroxylation Temperature on the Grafting of MAO and Ethylene Polymerization

Muhammad Ahsan Bashir,[a,c] Régis M. Gauvin,[b*] Laurent Delevoye,[b] Nicolas Merle,[a] Vincent Monteil,[a] Mostafa Taoufik,[a] Timothy F. L. McKenna,[a*] Christophe Boisson[a*]

[a]Université de Lyon, Univ Lyon 1, CPE Lyon, CNRS, UMR 5265, C2P2 (Chemistry, Catalysis, Polymers & Processes), Bat 308F, 43 Bd du 11 Novembre 1918, 69616 Villeurbanne, France

[b]UCCS (CNRS-UMR 8181), Université Lille Nord de France, USTL-ENSCL, 59652 Villeneuve d'Ascq, France

[c] Dutch Polymer Institute (DPI), P.O. Box 902, 5600 AX Eindhoven, the Netherlands.

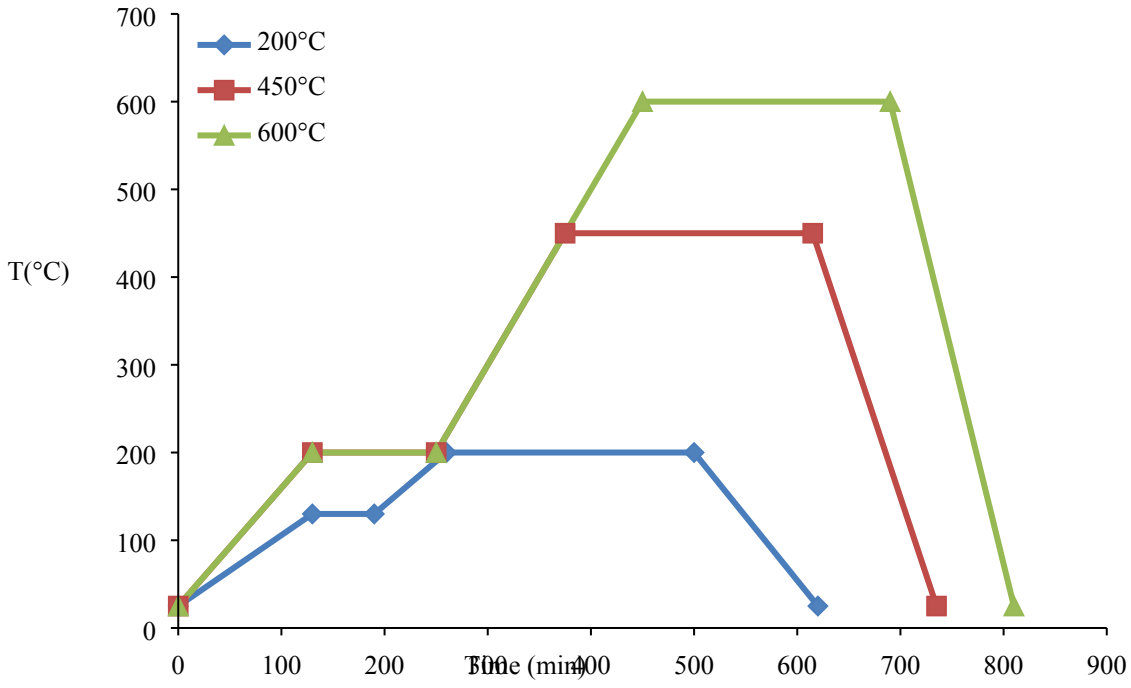

Figure S1. Temperature profiles used for silica dehydroxylation.

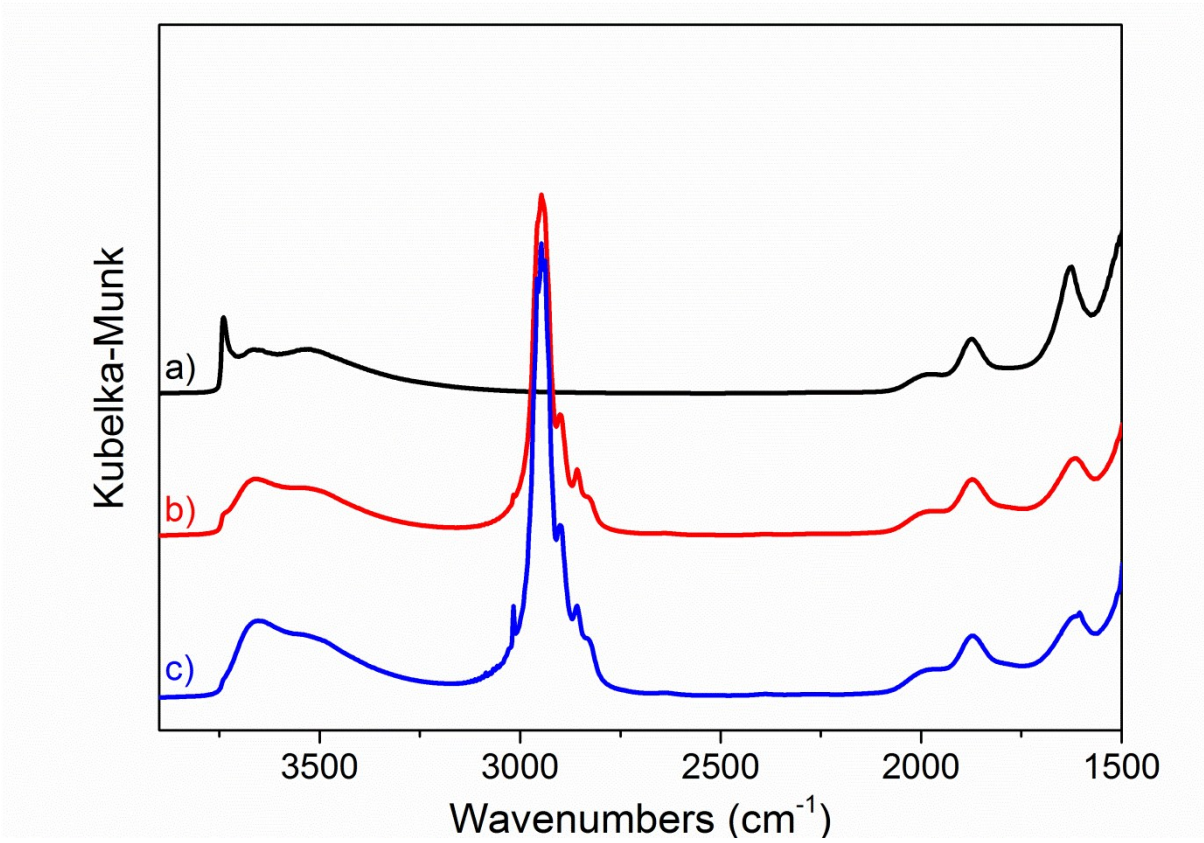

Figure S2. DRIFT spectra of silica-200°C (a), after reaction of MAO (SMAO-200°C) (b), after activation of $(n\text{-BuCp})_2ZrCl_2$ (n-BuCp-200°C) (c).

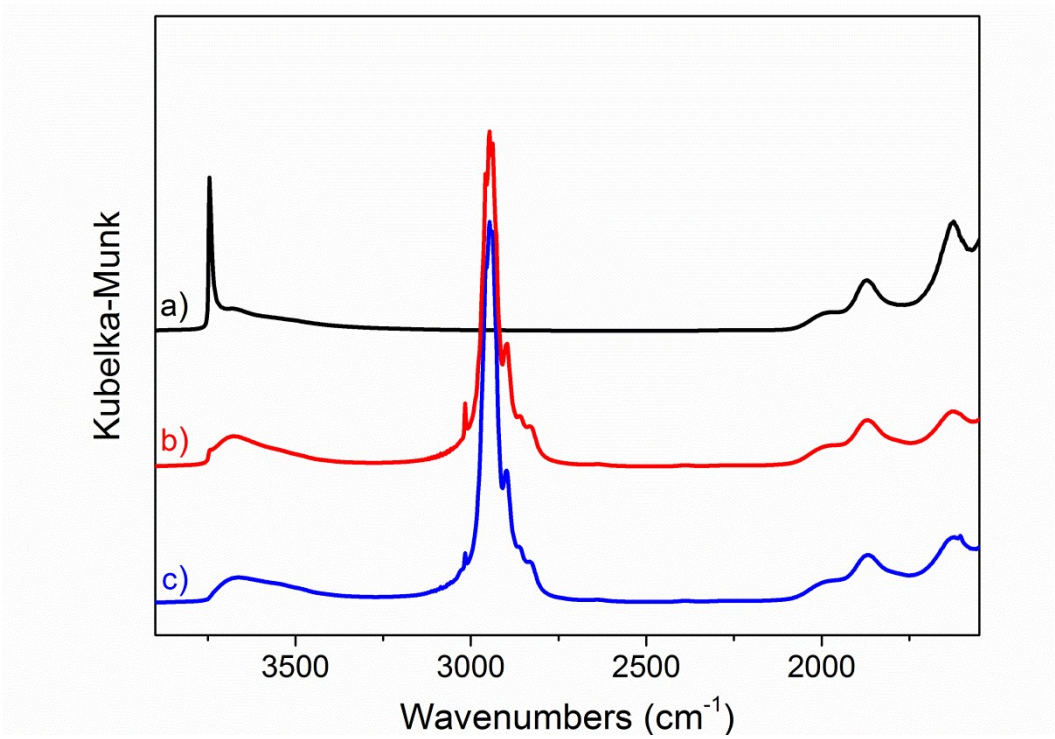

Figure S3. DRIFT spectra of silica-450°C (a), after reaction of MAO (SMAO-450°C) (b), after activation of $(n\text{-BuCp})_2ZrCl_2$ (n-BuCp-450°C) (c).

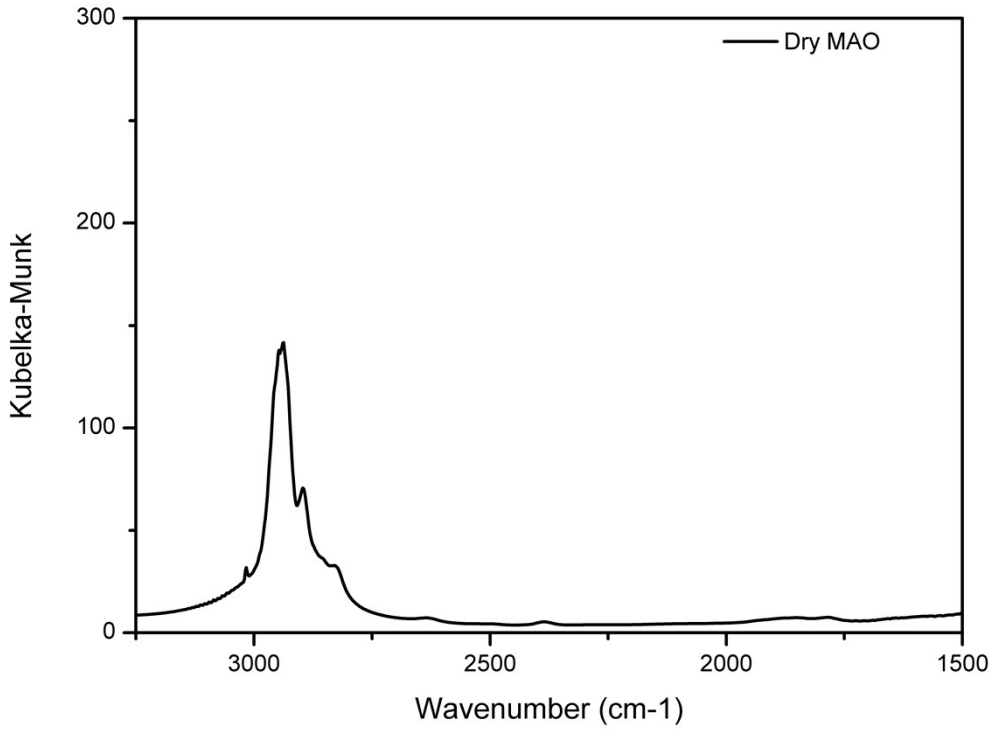

Figure S4. DRIFT spectrum of MAO dried at 100°C.

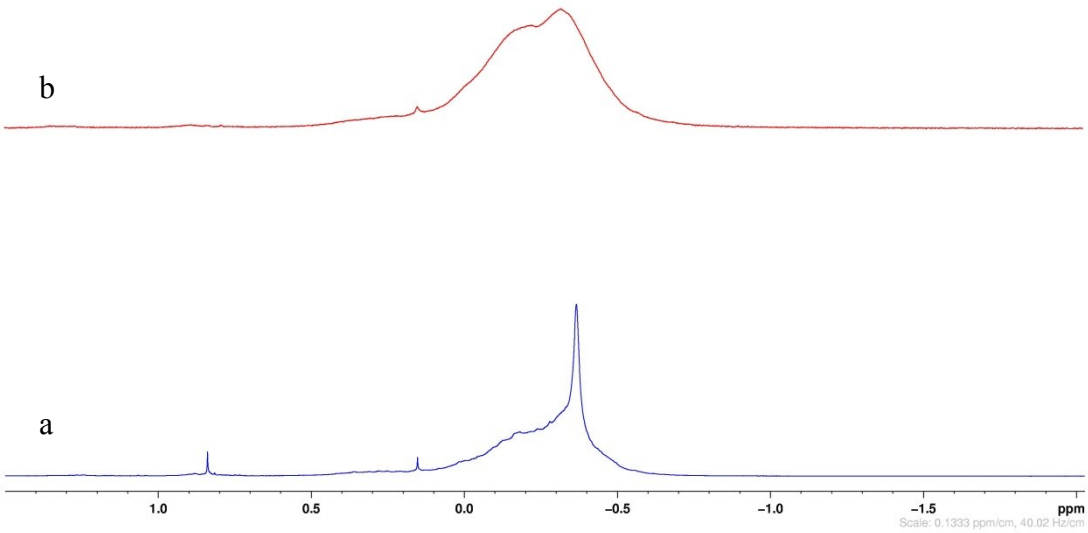

Figure S5. ^{1}H proton NMR spectrum of 30wt%MAO solution (a) and dried MAO obtained by heating the 30wt% MAO solution at 80°C under vacuum for 4h (b). Benezene was used to as solvent for both the NMR spectra.

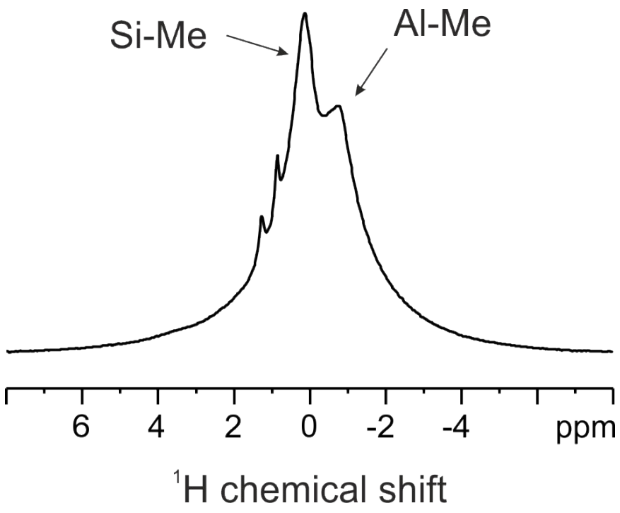

Figure S6. ^{1}H MAS NMR spectrum of $AlMe_3$ grafted on $SiO_{2\text{-}600}$ (18.8 T, at spinning speed 20 kHz).

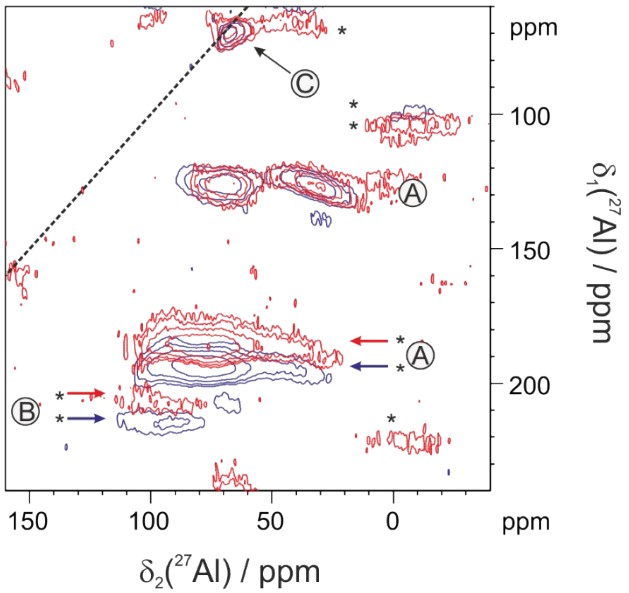

Figure S7. ^{27}Al MQ MAS spectrum of MAO (18.8 T), at spinning speed 20 kHz (blue) and 18 kHz (red); asterisks designate spinning side bands.

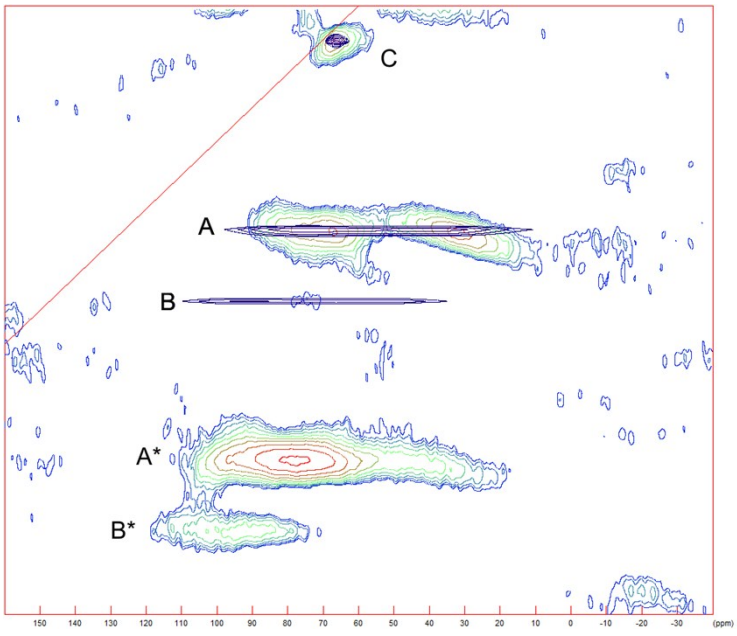

Figure S8. ^{27}Al MQ MAS spectrum of MAO (18.8 T), at spinning speed 20 kHz with simulated CS resonances. A: CS=100 ppm, C_Q=18 MHz; B: CS=119 ppm, C_Q=18.6 MHz; C: CS=69 ppm, C_Q<5 MHz. Asterix designate spinning side bands.

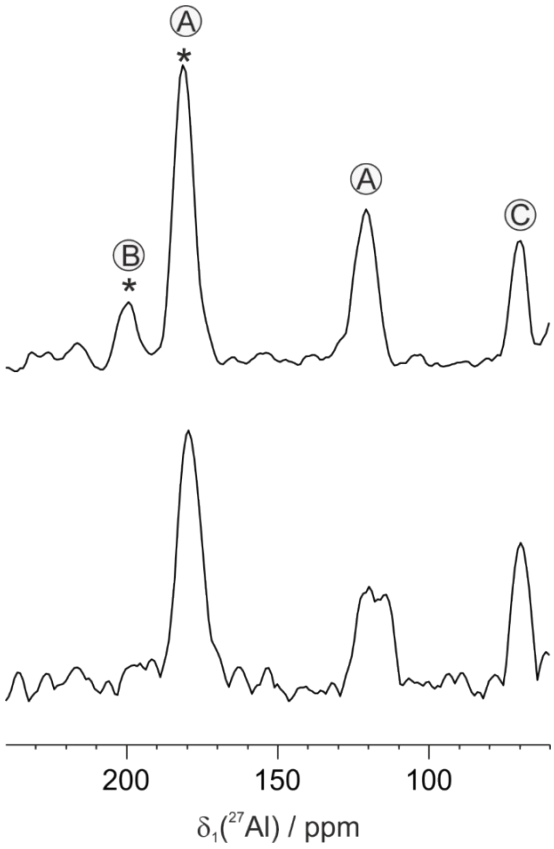

Figure S9. ^{27}Al MQ MAS isotropic projections of dried MAO (top) and SMAO-600 (bottom) (18.8 T). Asterisks designate spinning side bands.

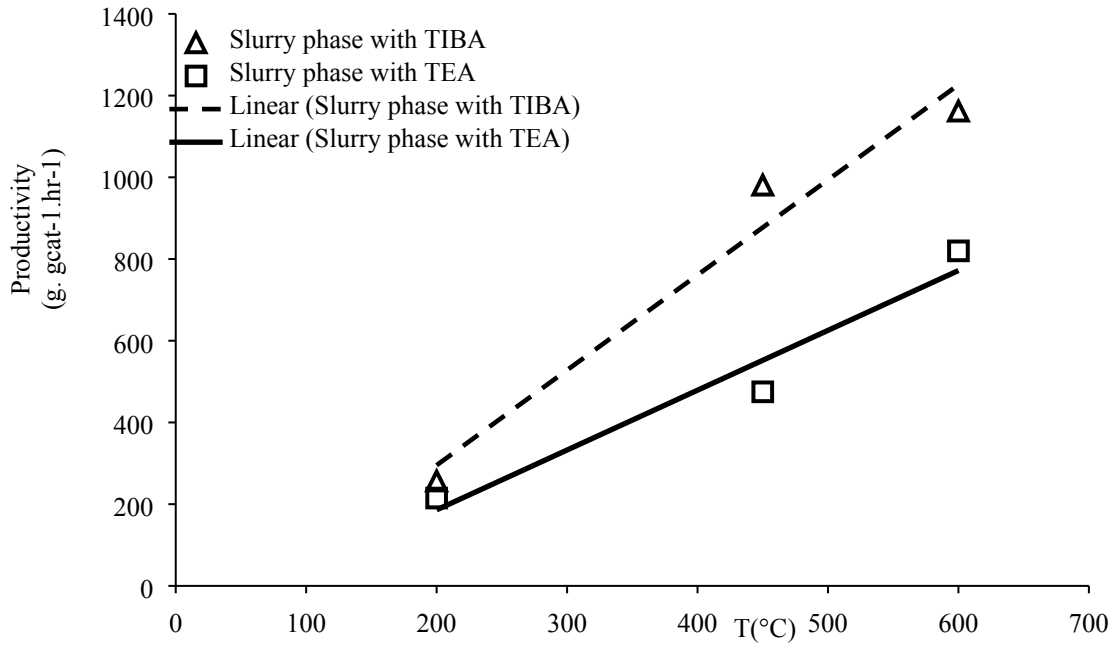

Figure S10. Average activities (or productivity) of the catalysts with different silica dehydroxylation temperatures in the presences of different scavenger in slurry polymerizations.

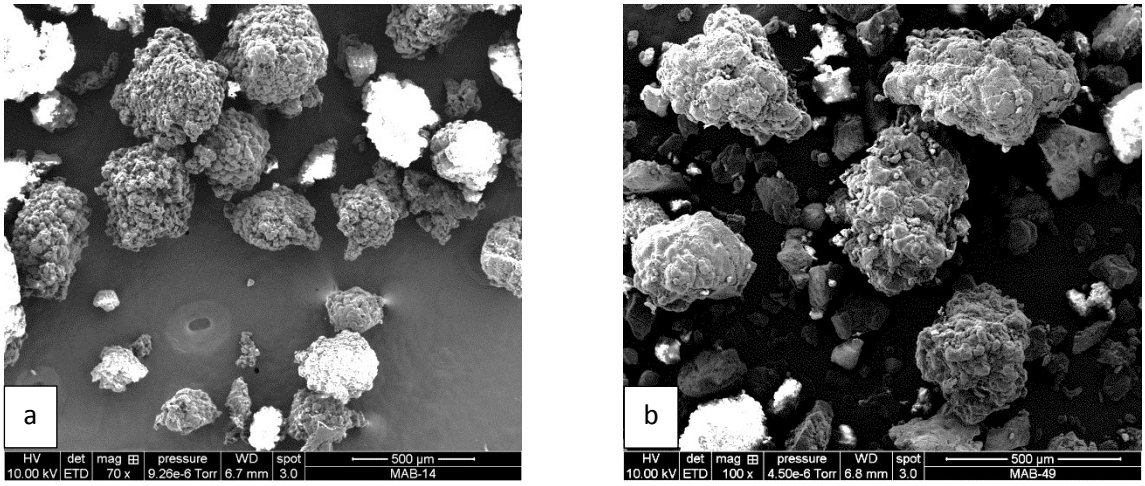

Figure S11. Comparison of polyethylene morphology produced in slurry (a) and gas phase (b) polymerizations using catalysts shown in Table 1.

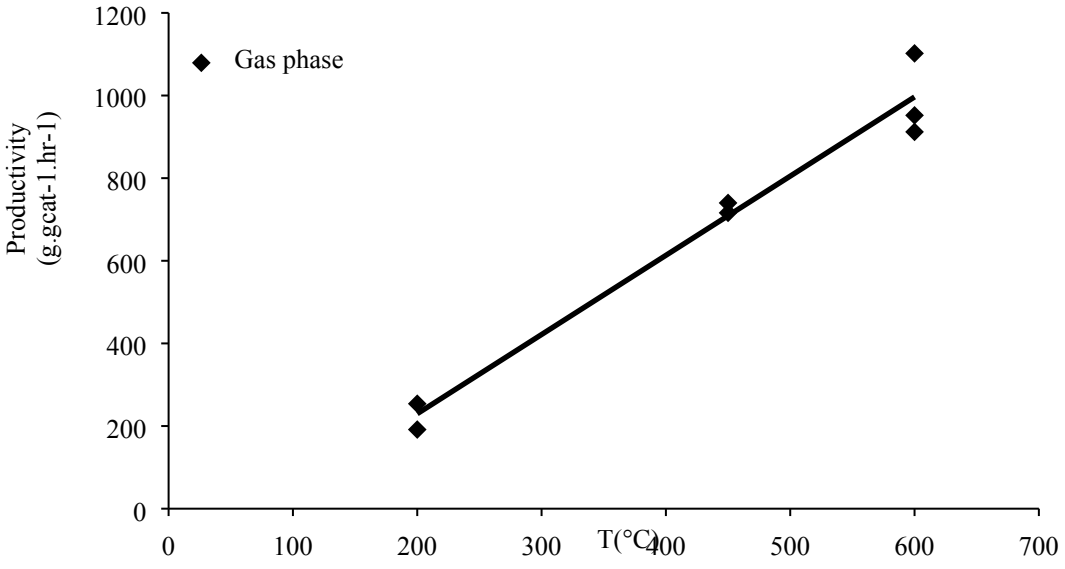

Figure S12. Comparison and reproducibility of catalysts average activity (or productivity) in gas phase homopolymerizations.