Figure S1. GC trace of product mixture resulting from the hydro-metathesis of neat 1-decene and catalyst precursor 3 at 150 °C after 3 days after quenching with CH$_2$Cl$_2$. The alkanes are assigned based on existing NIST library reference\textsuperscript{1}.
Figure S2. A time dependent product distribution plot of 1-decene hydro-metathesis reaction with \([\equiv\text{Si-O-}\)]\text{W(CH}_3\text{)}_3\) from 1 hour to 72 hours of reaction time. Olefins are represented as (■) and alkanes as (■).
Figure S3. A time dependent product distribution plot of 1-decene hydro-metathesis reaction with 
\[ \text{[(≡Si-O-)} \text{Mo(≡CtBu)(CH}_2\text{tBu)}_2] 2 } \text{ from 1 hour to 72 hours of reaction time. Olefins are represented as ( ) and alkanes as ( ).} \]
Figure S4. A time dependent product distribution plot of 1-decene hydro-metathesis reaction with [(≡Si-O)Ta(≡CH'Bu)(CH₂'Bu)₂] 3 from 1 hour to 72 hours of reaction time. Olefins are represented as (■) and alkanes as (□).
Figure S5. Time vs. TON plot for 1-decene hydro-metathesis reaction using catalysts [(≡Si-\text{-}O-\text{-}W(\text{CH}_3)_5)]_1, [(≡Si-\text{-}O-\text{-}Mo(≡C'\text{Bu})(\text{CH}_2'\text{Bu})_2)]_2, and [(≡Si-\text{-}O)\text{Ta}(=\text{CH'}\text{Bu})(\text{CH}_2'\text{Bu})_2)]_3 in a batch reactor condition.
Figure S6A. GC trace of product mixture resulting from the olefin metathesis of neat 1-decene and catalyst precursor 3 at 150 °C after 72 hours after quenching with CH₂Cl₂. The olefins are assigned based on existing NIST library reference.
Figure S6B. GC trace of product mixture resulting from the olefin metathesis of neat 1-decene and catalyst precursor 3 \([\equiv \text{Si-O-})\text{Ta}(=\text{CH}^\text{Bu})(\text{CH}_2^\text{Bu})_2]\) (absolute values in mmols of decene vs. different decene isomers) at 150 °C after 72 hours after quenching with CH$_2$Cl$_2$. The olefins are assigned based on existing NIST library reference.
Figure S7: $^1$H (A) and $^{13}$C (B) NMR of catalyst 1 after hydro-metathesis reaction of 1-decene

Figure S8: IR data of catalyst 1 after hydro-metathesis reaction of 1-decene
Figure S9. $^1$H NMR spectrum of WMe$_6$ in CD$_2$Cl$_2$ at 203 K.

Figure S10. $^{13}$C NMR spectrum of WMe$_6$ in CD$_2$Cl$_2$ at 203 K.
Figure S11. $^1$H NMR spectrum of [Mo(≡C′Bu)(CH$_2$′Bu)$_3$] in CD$_2$Cl$_2$ at 298 K.

Figure S12. $^{13}$C NMR spectrum of [Mo(≡C′Bu)(CH$_2$′Bu)$_3$] in CD$_2$Cl$_2$ at 298 K.
Figure S13. $^1$H NMR spectrum of [Ta(=C'H'Bu)(CH$_2$'Bu)$_3$] in C$_6$D$_6$ at 298 K

Figure S14. $^{13}$C NMR spectrum of [Ta(=C'H'Bu)(CH$_2$'Bu)$_3$] in C$_6$D$_6$ at 298 K
Figure S15. FT-IR spectroscopy of silica partially dehydroxylated at 700 °C (blue curve) and W(CH₃)₆ grafted on silica-700 (1) (Orange curve)
Figure S16. FT-IR spectroscopy of silica partially dehydroxylated at 700 °C (blue curve) and [Ta(=CHtBu)(CH2tBu)3] grafted on silica-700 (3) (Orange curve)
Figure S17. FT-IR spectroscopy of silica partially dehydroxylated at 700 °C (blue curve) and [Mo(≡C′Bu)(CH₂Bu)₃] grafted on silica-700 (2) (Orange curve)

[1]. For NIST standard reference database see, 