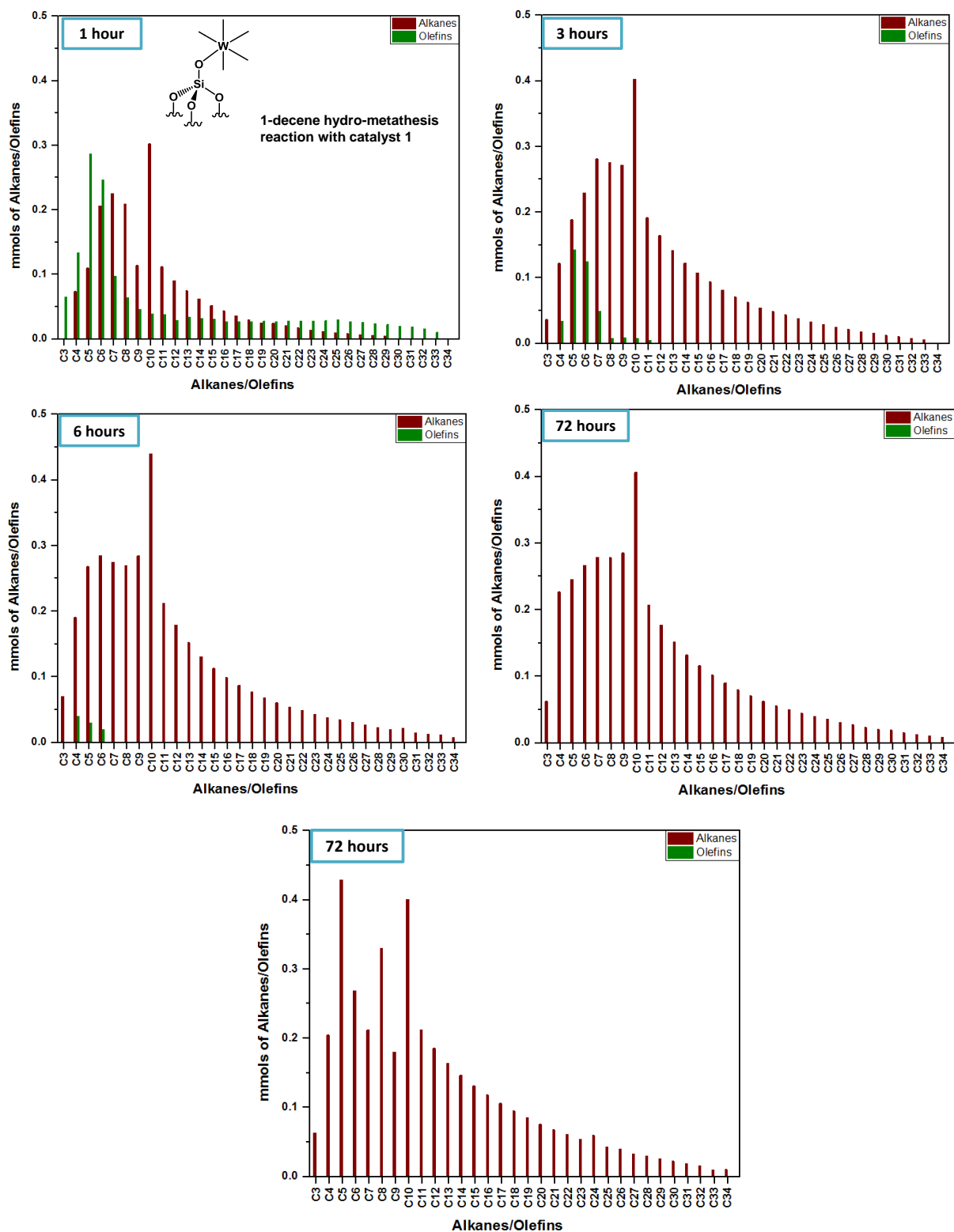
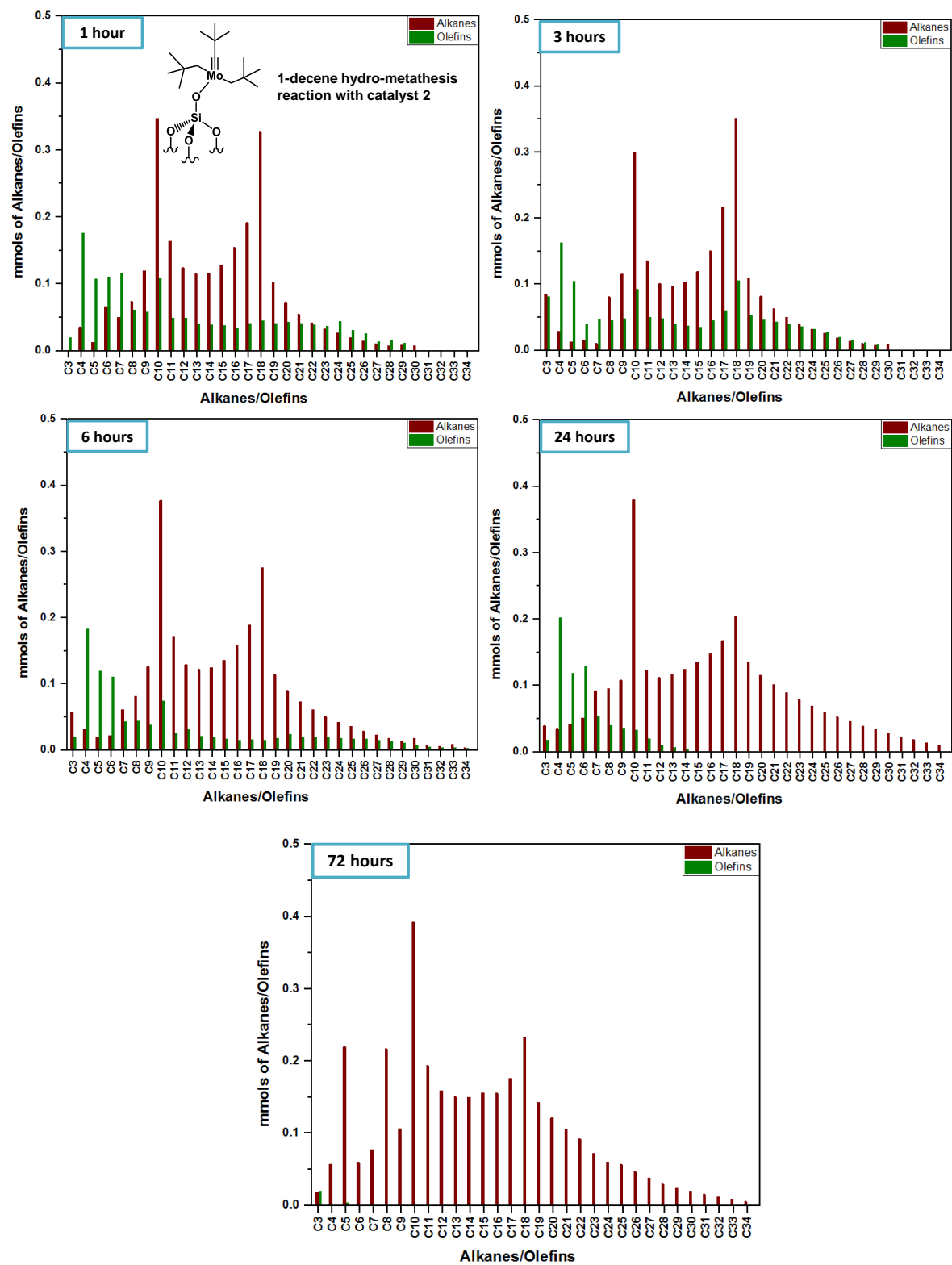


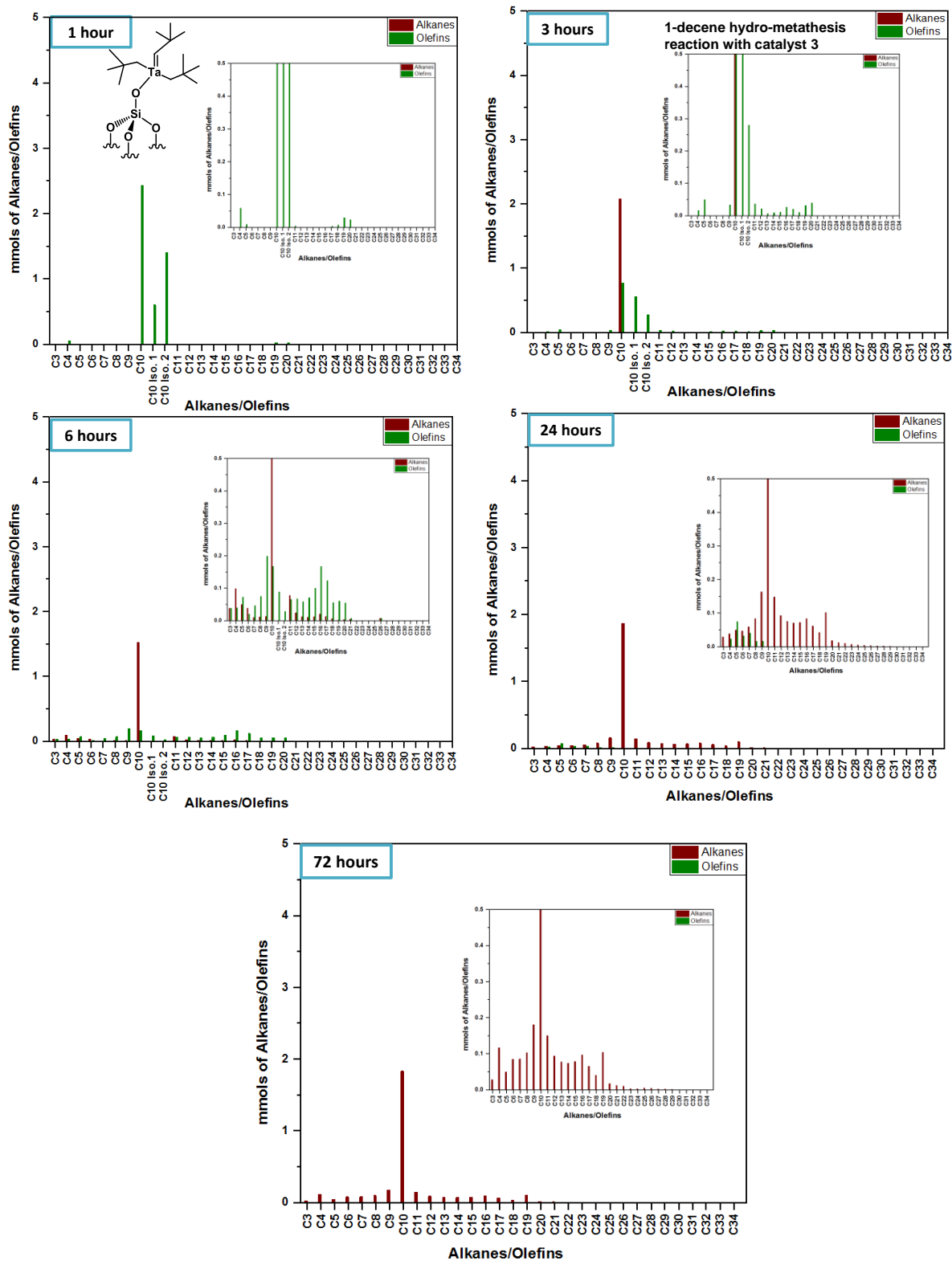
**Figure S1.** GC trace of product mixture resulting from the hydro-metathesis of neat 1-decene and catalyst precursor **3** at 150 °C after 3 days after quenching with CH<sub>2</sub>Cl<sub>2</sub>. The alkanes are assigned based on existing NIST library reference<sup>1</sup>



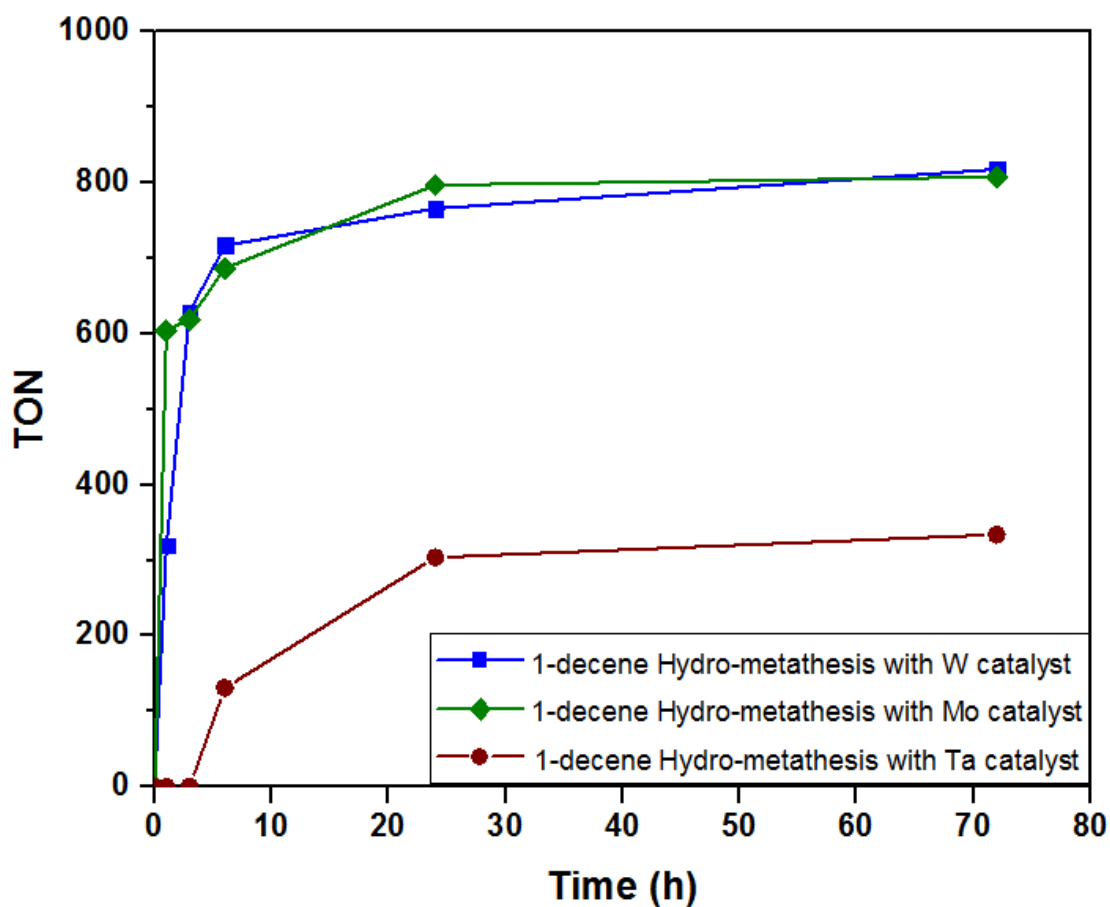
**Figure S2.** A time dependent product distribution plot of 1-decene hydro-metathesis reaction with  $[(\equiv\text{Si}-\text{O}-)\text{W}(\text{CH}_3)_5]$  **1** from 1 hour to 72 hours of reaction time. Olefins are represented as (■) and alkanes as (■).



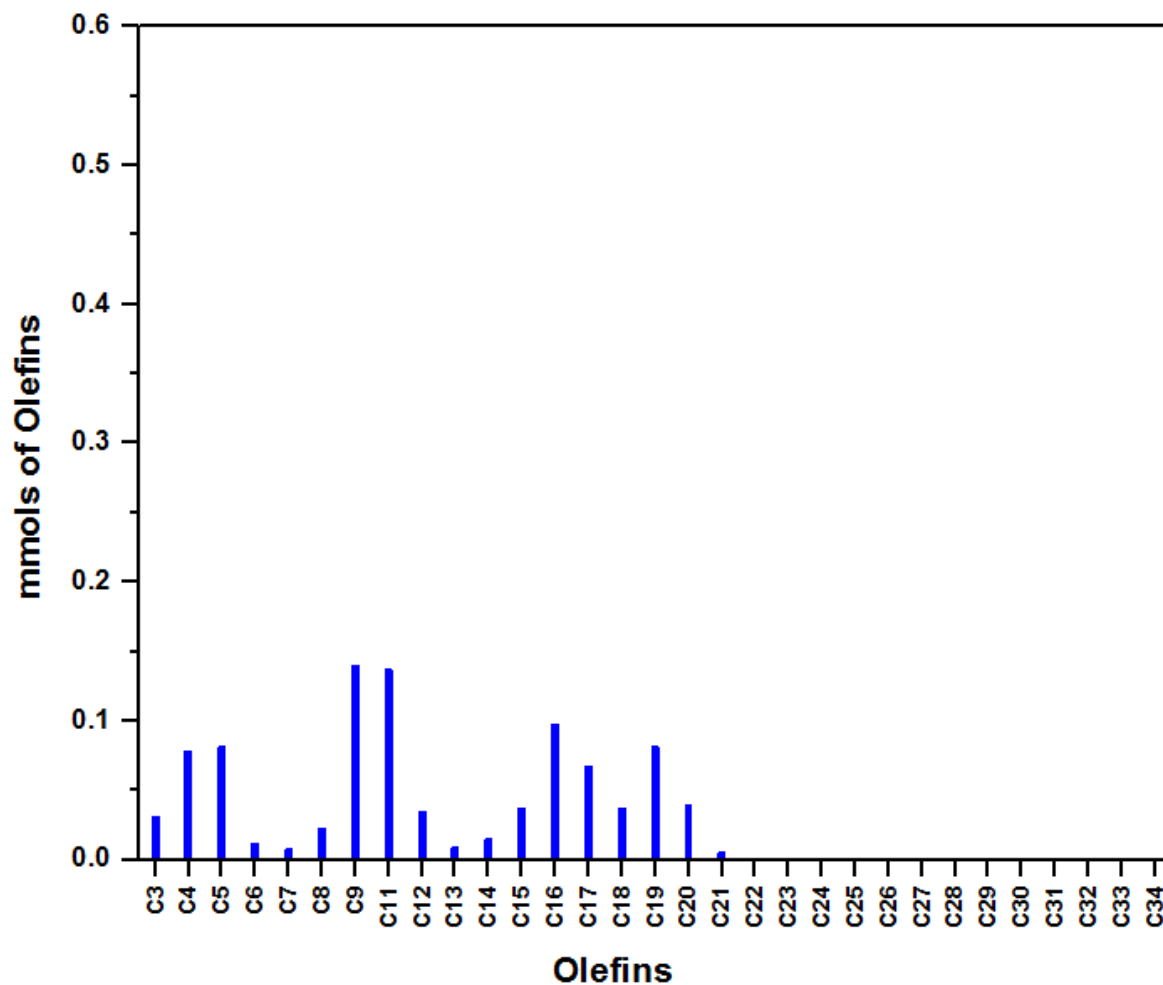
**Figure S3.** A time dependent product distribution plot of 1-decene hydro-metathesis reaction with  $[(\equiv\text{Si-O-})\text{Mo}(\equiv\text{C}^t\text{Bu})(\text{CH}_2^t\text{Bu})_2]$  **2** from 1 hour to 72 hours of reaction time. Olefins are represented as (■) and alkanes as (■).



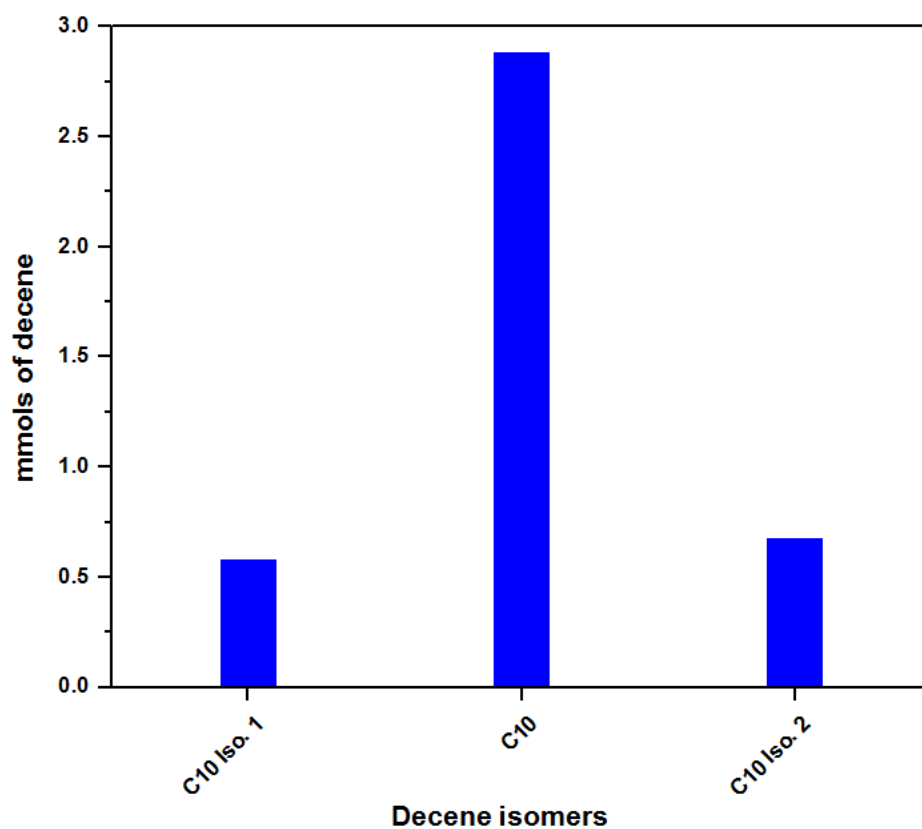
**Figure S4.** A time dependent product distribution plot of 1-decene hydro-metathesis reaction with  $[(\equiv\text{Si}-\text{O})\text{Ta}(\text{=CH}^t\text{Bu})(\text{CH}_2^t\text{Bu})_2]$  **3** from 1 hour to 72hours of reaction time. Olefins are represented as (■) and alkanes as (■).



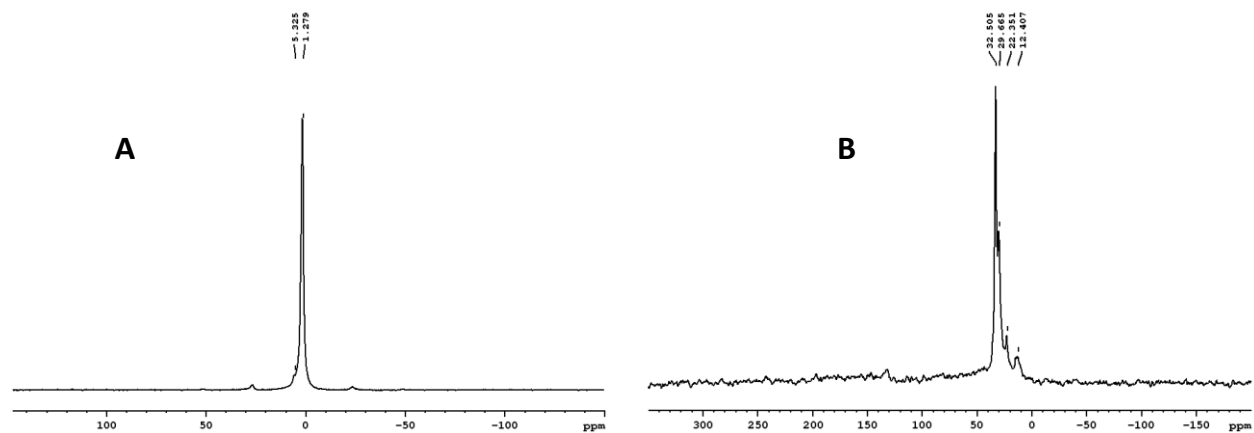
**Figure S5.** Time vs. TON plot for 1-decene hydro-metathesis reaction using catalysts  $[(\equiv\text{Si-O-})\text{W}(\text{CH}_3)_5]$  **1**,  $[(\equiv\text{Si-O-})\text{Mo}(\equiv\text{C}^t\text{Bu})(\text{CH}_2^t\text{Bu})_2]$  **2** and  $[(\equiv\text{Si-O-})\text{Ta}(\equiv\text{CH}^t\text{Bu})(\text{CH}_2^t\text{Bu})_2]$  **3** in a batch reactor condition.



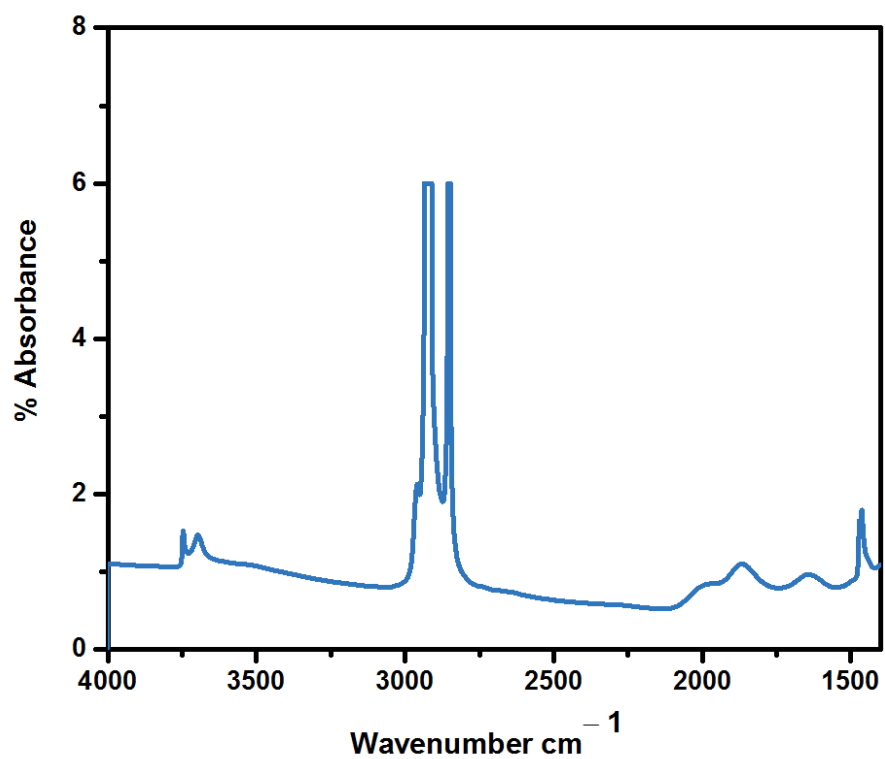
**Figure S6A.** GC trace of product mixture resulting from the olefin metathesis of neat 1-decene and catalyst precursor **3** at 150 °C after 72 hours after quenching with CH<sub>2</sub>Cl<sub>2</sub>. The olefins are assigned based on existing NIST library reference



**Figure S6B.** GC trace of product mixture resulting from the olefin metathesis of neat 1-decene and catalyst precursor **3** [ $(\equiv\text{Si-O-})\text{Ta}(\text{=CH}^t\text{Bu})(\text{CH}_2^t\text{Bu})_2$ ] (absolute values in mmols of decene vs. different decene isomers) at 150 °C after 72 hours after quenching with  $\text{CH}_2\text{Cl}_2$ . The olefins are assigned based on existing NIST library reference

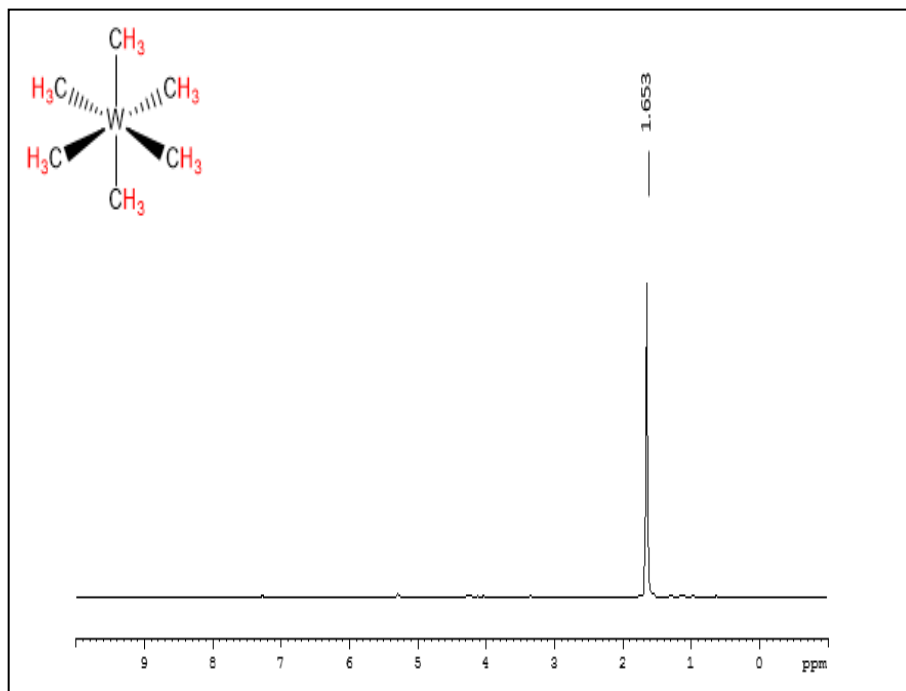


**Figure S7:**  $^1\text{H}$  (A) and  $^{13}\text{C}$  (B) NMR of catalyst **1** after hydro-metathesis reaction of 1-decene

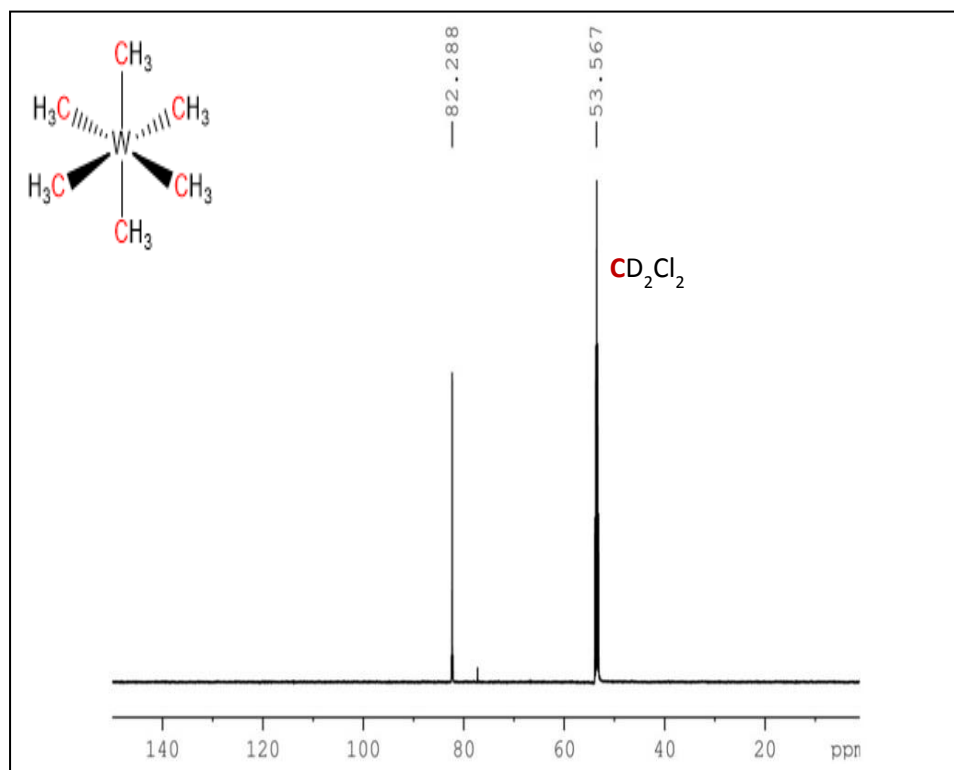


**Figure S8:** IR data of catalyst **1** after hydro-metathesis reaction of 1-decene

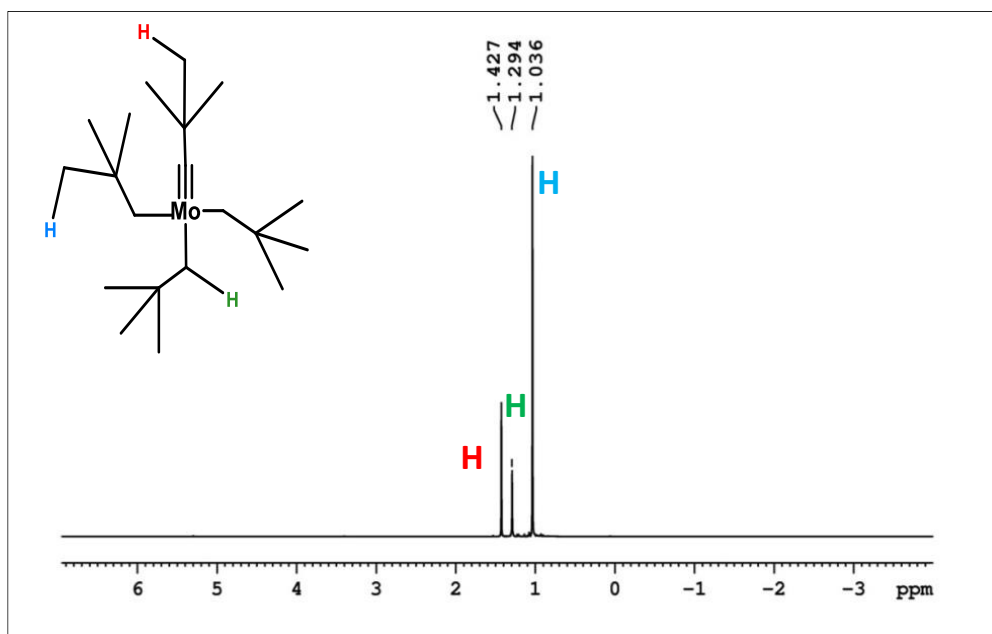




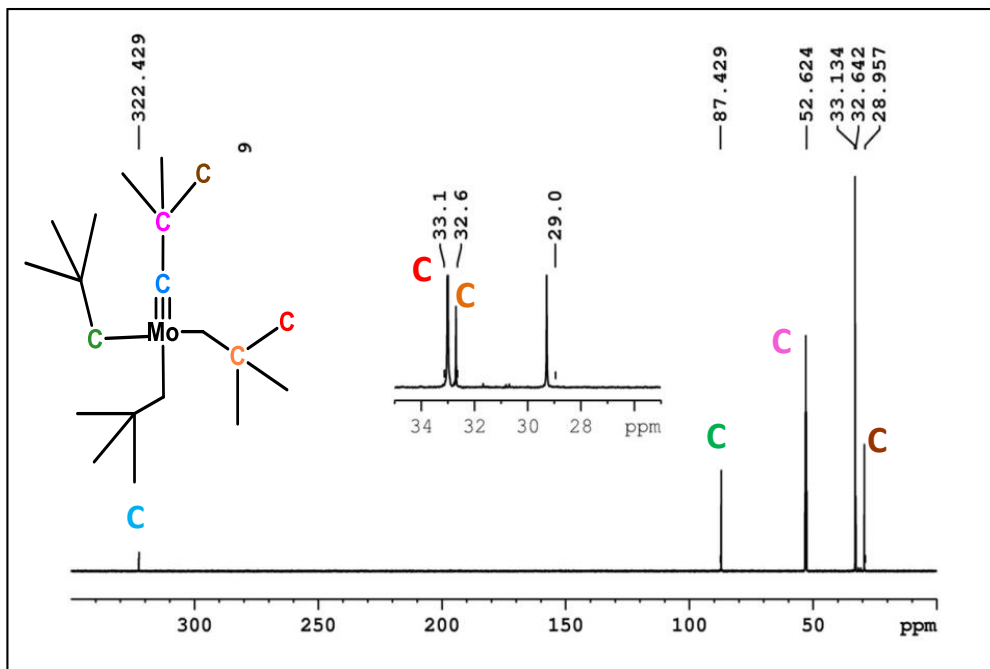
**Figure S9.**  $^1\text{H}$  NMR spectrum of  $\text{WMe}_6$  in  $\text{CD}_2\text{Cl}_2$  at 203 K.



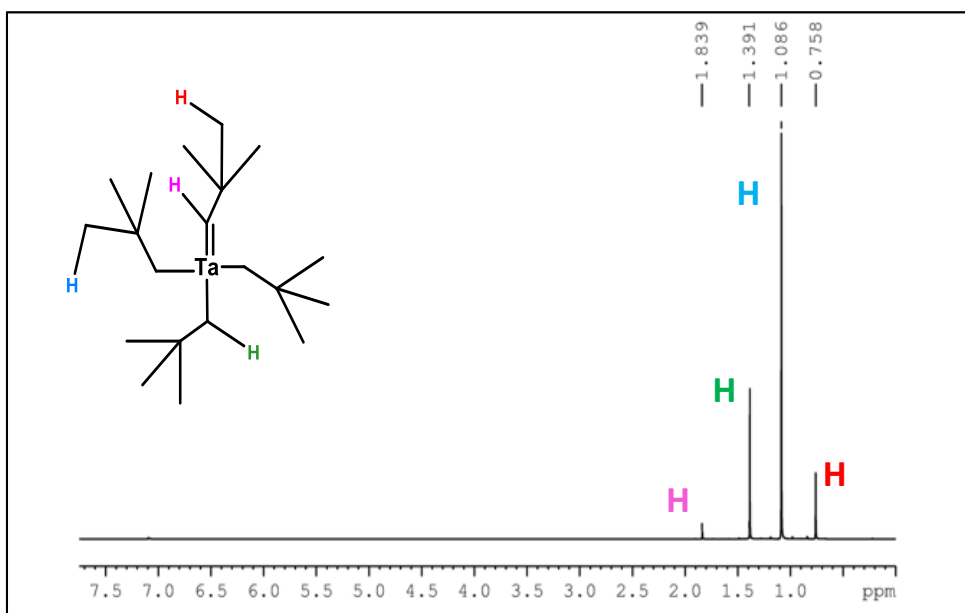
**Figure S10.**  $^{13}\text{C}$  NMR spectrum of  $\text{WMe}_6$  in  $\text{CD}_2\text{Cl}_2$  at 203 K.



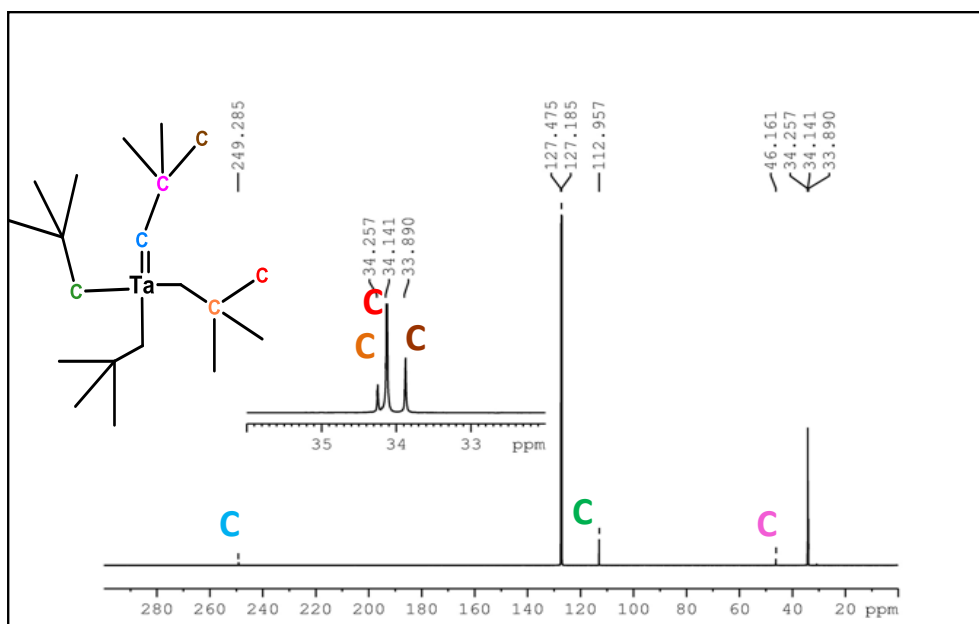
**Figure S11.**  $^1\text{H}$  NMR spectrum of  $[\text{Mo}(\equiv\text{C}'\text{Bu})(\text{CH}_2'\text{Bu})_3]$  in  $\text{CD}_2\text{Cl}_2$  at 298 K



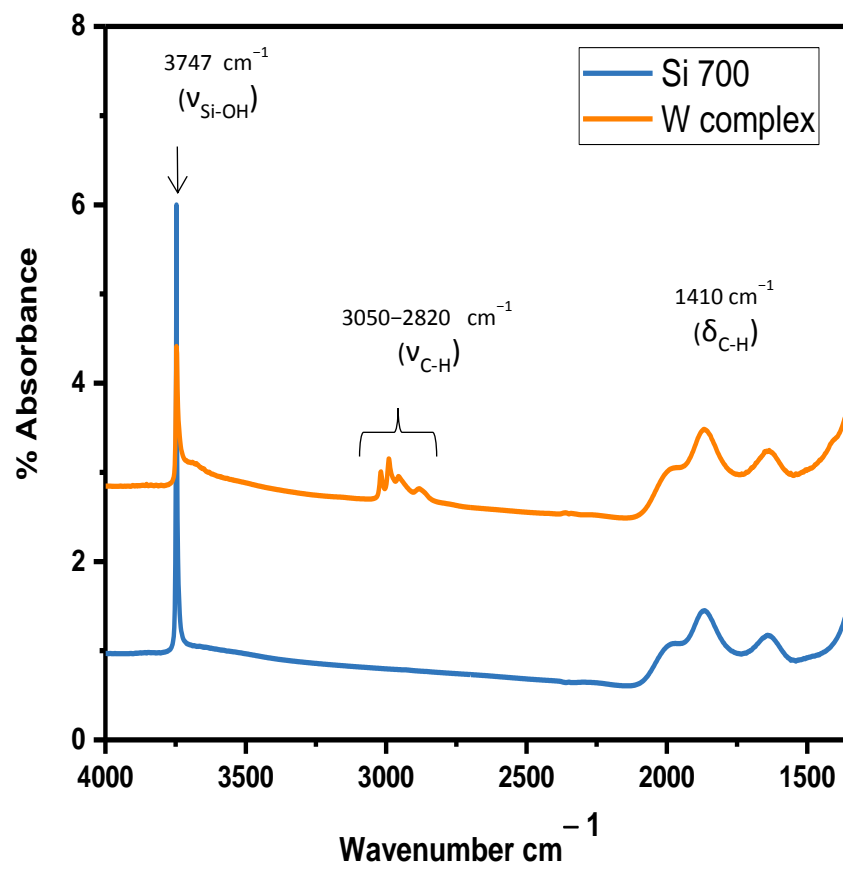
**Figure S12.**  $^{13}\text{C}$  NMR spectrum of  $[\text{Mo}(\equiv\text{C}'\text{Bu})(\text{CH}_2'\text{Bu})_3]$  in  $\text{CD}_2\text{Cl}_2$  at 298 K.



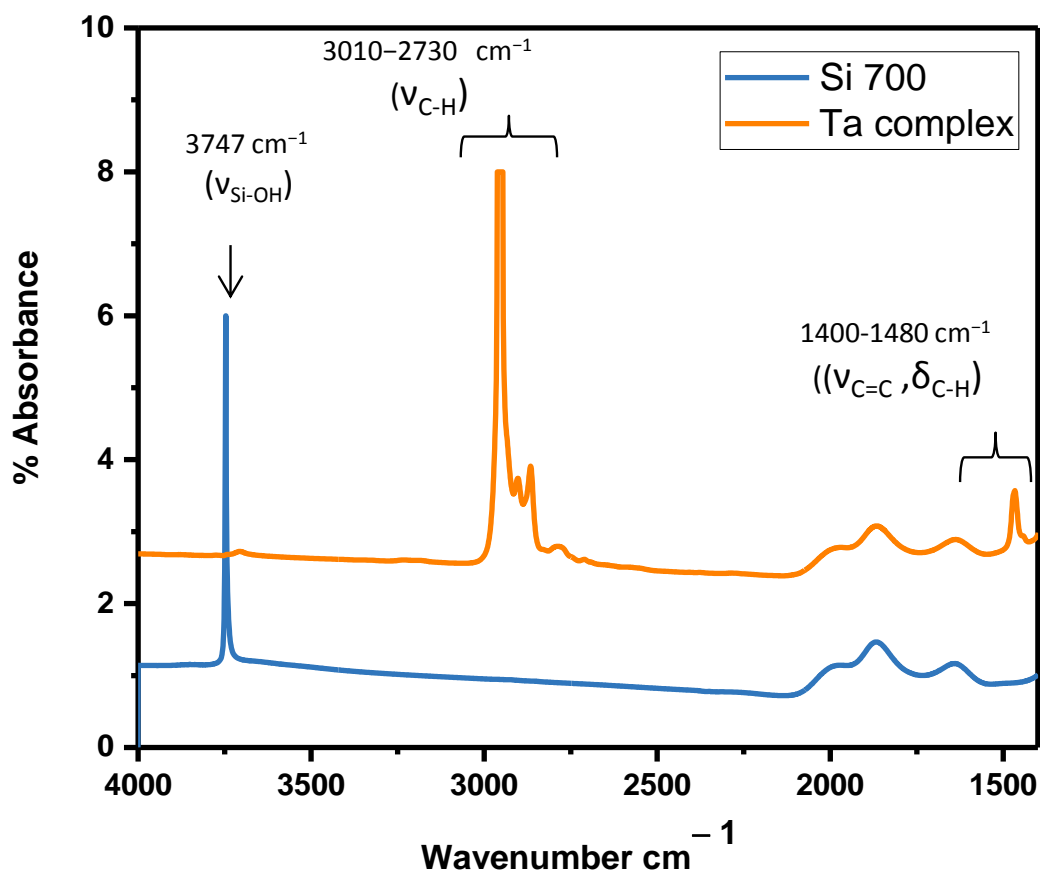
**Figure S13.**  $^1H$  NMR spectrum of  $[Ta(=CH'Bu)(CH_2'Bu)_3]$  in  $C_6D_6$  at 298 K



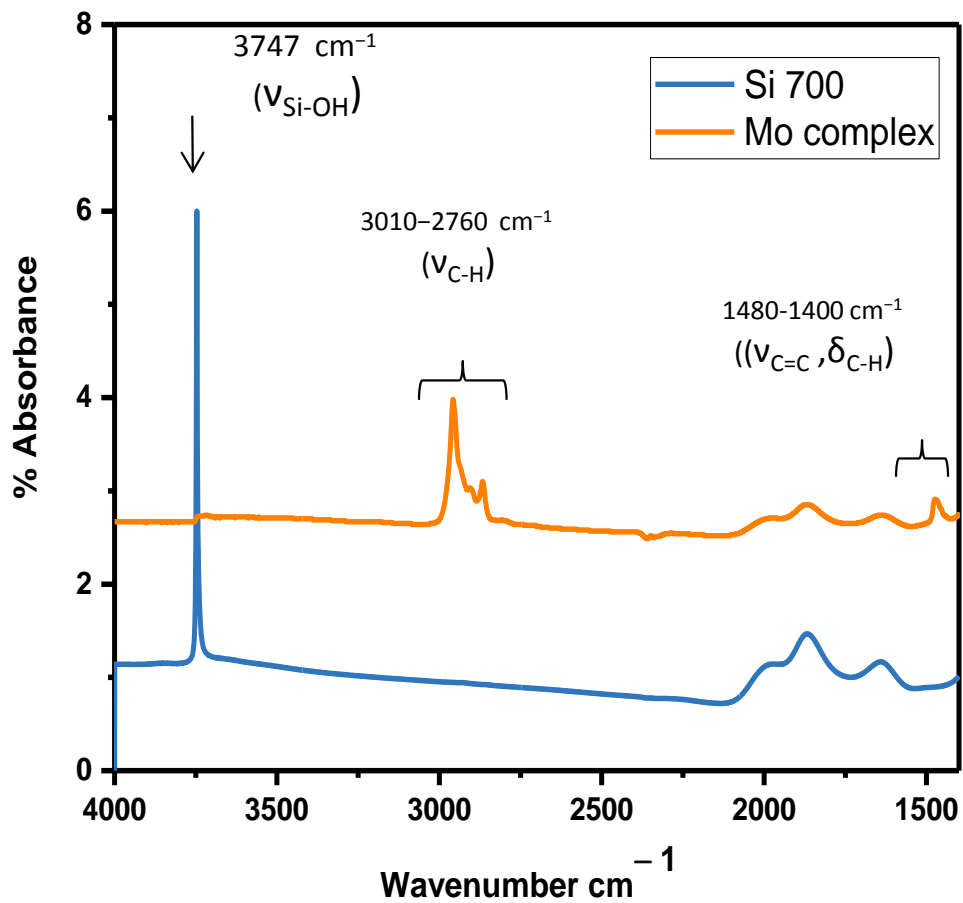
**Figure S14.**  $^{13}C$  NMR spectrum of  $[Ta(=CH'Bu)(CH_2'Bu)_3]$  in  $C_6D_6$  at 298 K



**Figure S15.** FT-IR spectroscopy of silica partially dehydroxylated at  $700 \text{ }^\circ\text{C}$  (blue curve) and  $\text{W}(\text{CH}_3)_6$  grafted on silica-700 (**1**) (Orange curve)



**Figure S16.** FT-IR spectroscopy of silica partially dehydroxylated at  $700 \text{ }^\circ\text{C}$  (blue curve) and  $[\text{Ta}(=\text{CH}^t\text{Bu})(\text{CH}_2^t\text{Bu})_3]$  grafted on silica-700 (**3**) (Orange curve)



**Figure S17.** FT-IR spectroscopy of silica partially dehydroxylated at  $700 \text{ }^{\circ}\text{C}$  (blue curve) and  $[\text{Mo}(\equiv\text{C}'\text{Bu})(\text{CH}_2'\text{Bu})_3]$  grafted on silica-700 (2) (Orange curve)

[1]. For NIST standard reference database see,

<http://webbook.nist.gov/chemistry/>.