Supporting Information

Synthesis of β-diketiminate-ligated bimetallic and monometallic lanthanide amide complexes and their reactivity with isoprene and $AlMe_3$

Song Sun,[a] Hao Ouyang,[a] Yunjie Luo,*[,b] Yong Zhang,[a] Qi Shen,[a] and Yingming Yao*[,a]

[a] *Key Laboratory of Organic Synthesis of Jiangsu Province, College of Chemistry, Chemical Engineering and Materials Science, Dushu Lake Campus, Soochow University, Suzhou 215123, People's Republic of China*

[b] *Organometallic Chemistry Laboratory, Ningbo Institute of Technology, Zhejiang University, Ningbo 315100, P. R. China*

* To whom correspondence should be addressed.

E-mail: yaoym@suda.edu.cn; lyj@nit.zju.edu.cn

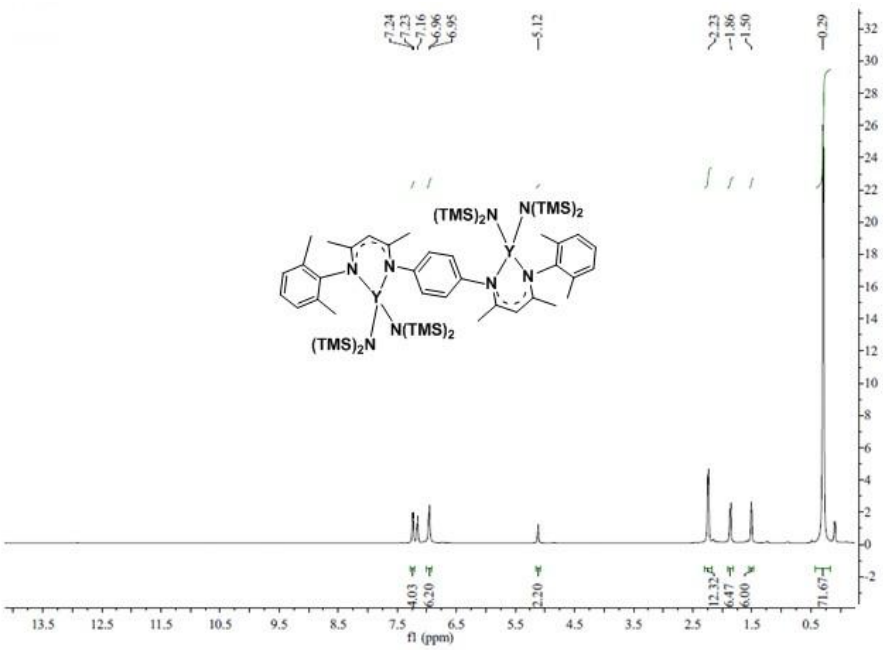

Figure S1. ^{1}H NMR spectrum of complex **1** (400 MHz, C_6D_6)

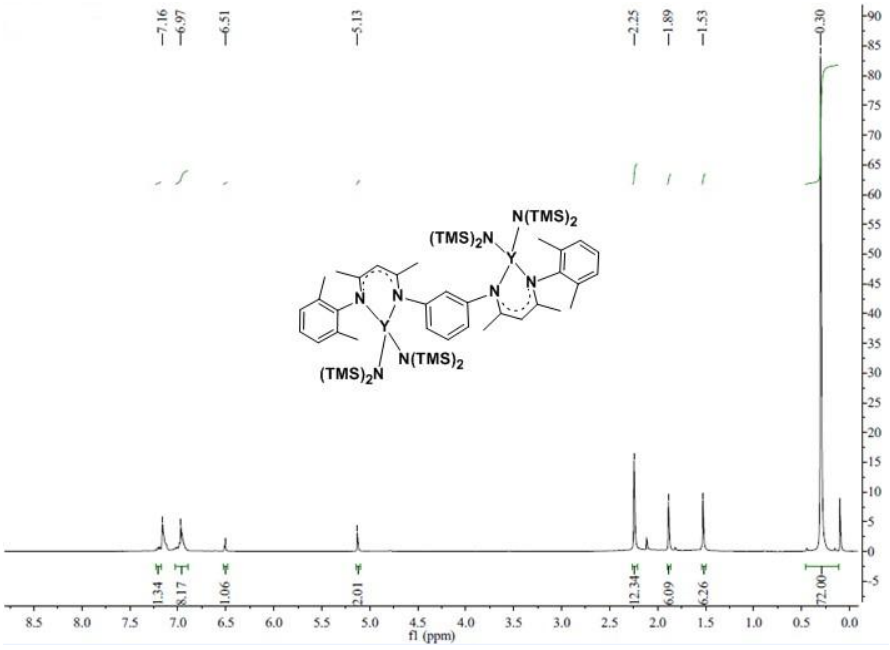

Figure S2. ^{1}H NMR spectrum of complex **3** (400 MHz, C_6D_6)

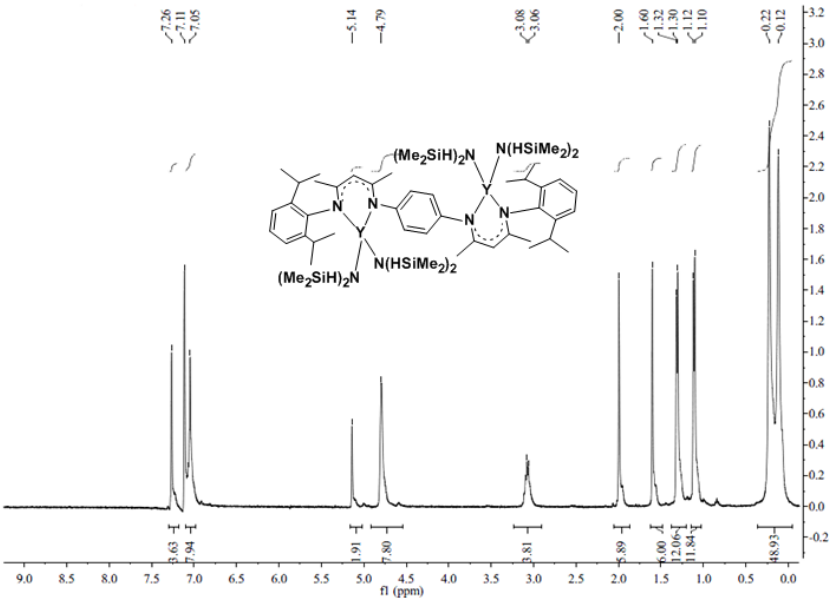

Figure S3. ^{1}H NMR spectrum of complex **4** (400 MHz C_6D_6)

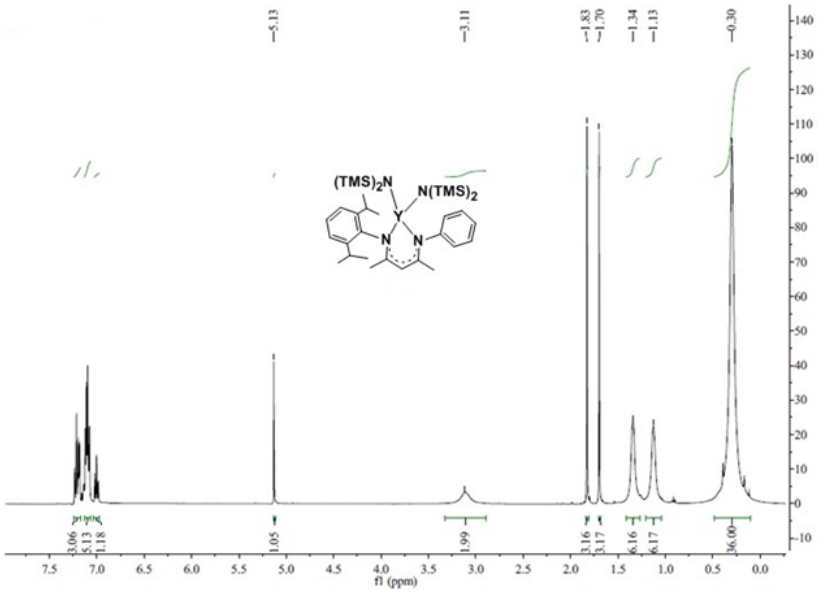

Figure S4. ^{1}H NMR spectrum of complex **6** (400 MHz, C_6D_6)

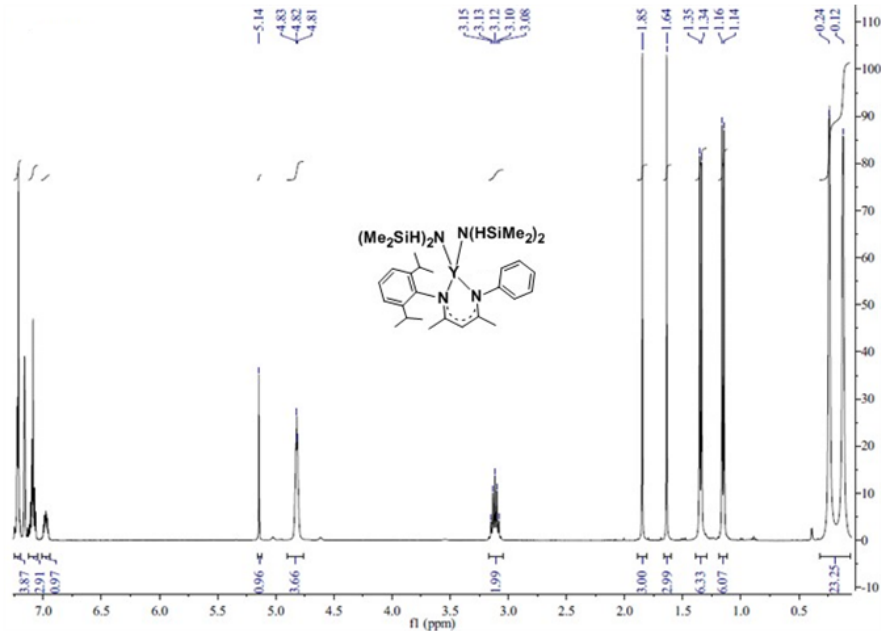

Figure S5. ^{1}H NMR spectrum of complex **7** (400 MHz, C_6D_6)

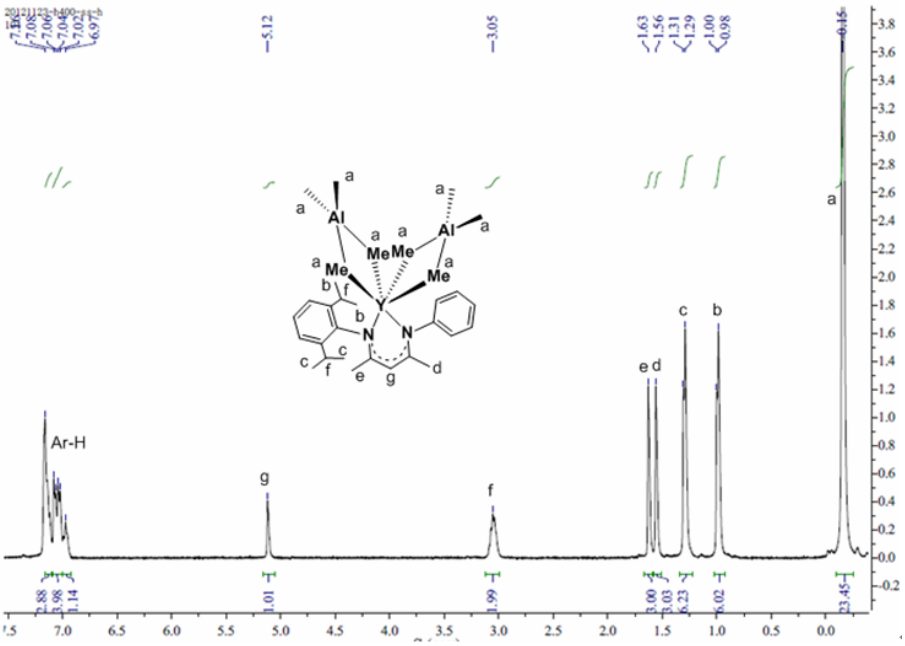

Figure S6. ^{1}H NMR spectrum of complex **8** (400 MHz, C_6D_6)

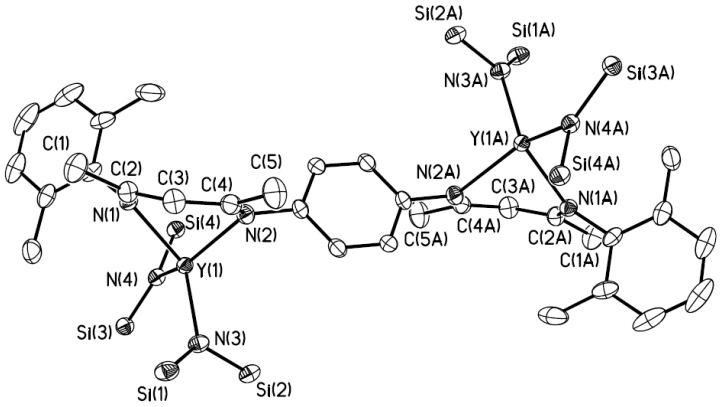

Figure S7. ORTEP diagram of complex **1** showing an atom numbering scheme. Thermal ellipsoids are drawn at the 30% probability level, and hydrogen atoms are omitted for clarity.

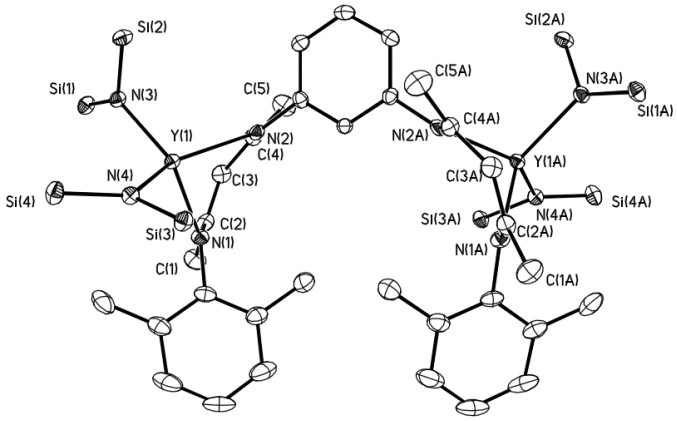

Figure S8. ORTEP diagram of complex **3** showing an atom numbering scheme. Thermal ellipsoids are drawn at the 30% probability level, and hydrogen atoms are omitted for clarity.

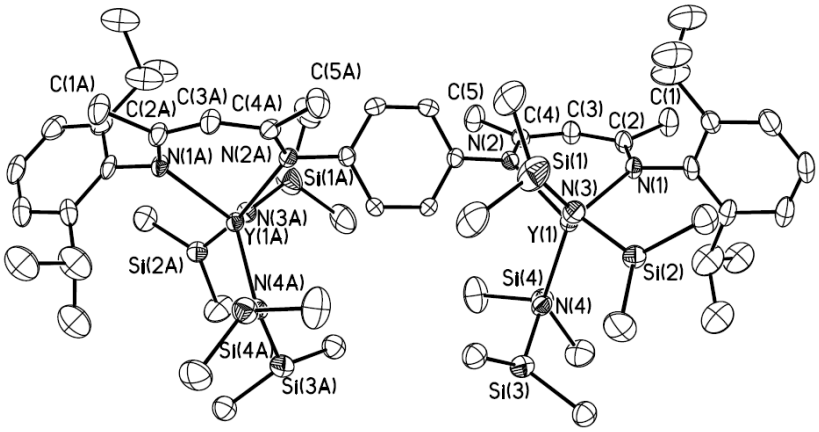

Figure S9. ORTEP diagram of complex **4** showing an atom numbering scheme. Thermal ellipsoids are drawn at the 30% probability level, and hydrogen atoms are omitted for clarity.

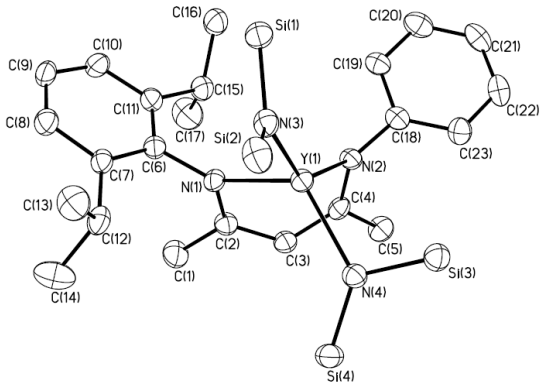

Figure S10. ORTEP diagram of complex **6** showing an atom numbering scheme. Thermal ellipsoids are drawn at the 30% probability level, and hydrogen atoms are omitted for clarity.

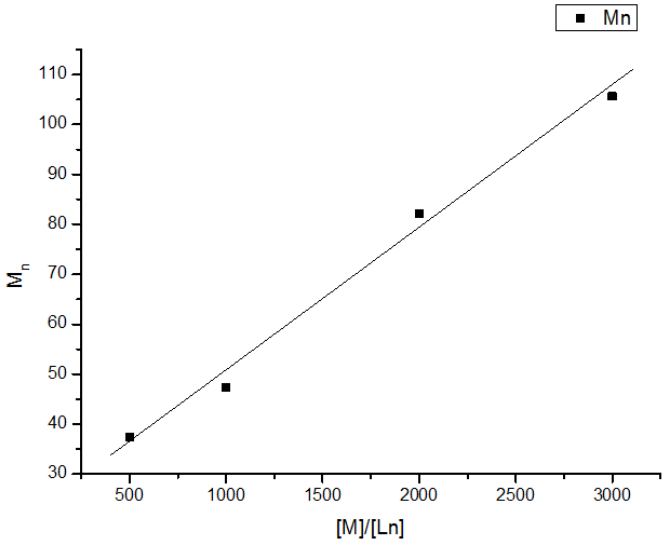

Figure S11. Polymerization of isoprene with complex **4** under activation of organic broate and trialkylaluminium. Relationship between the number-averaged molecular weight (*M*n) and the molar ratio of monomer to initiator.

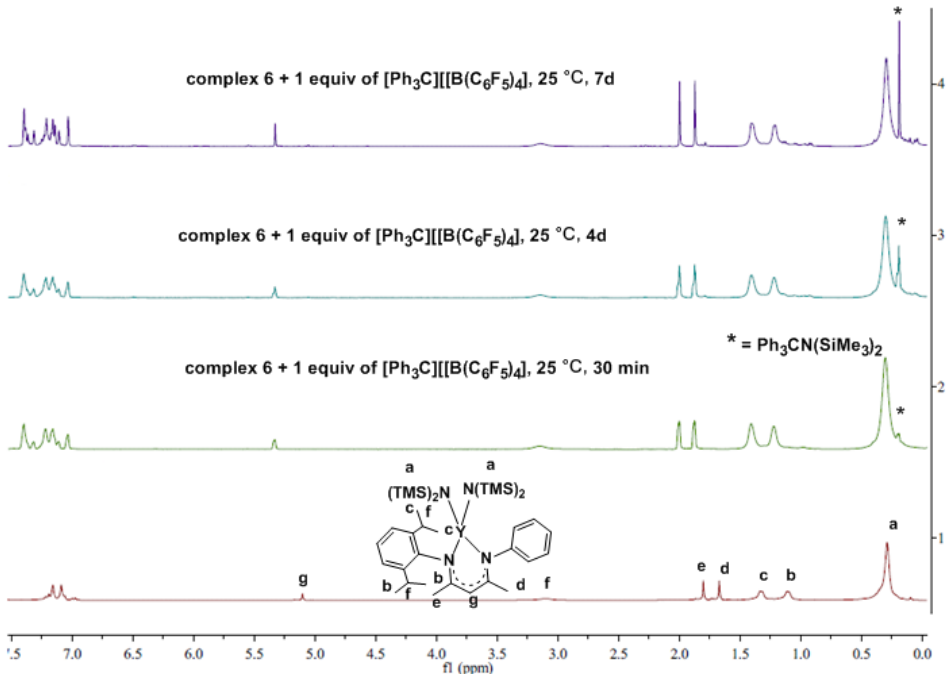

Figure S12. Combined ^{1}H NMR spectrum of the reaction of complex **6** + 1 equiv of $[Ph_3C][B(C_6F_5)_4]$, 25 °C, after 30 min, (2), 4 days (3), 7 days (4). (400 MHz, C_6D_5Cl+C_6D_6)

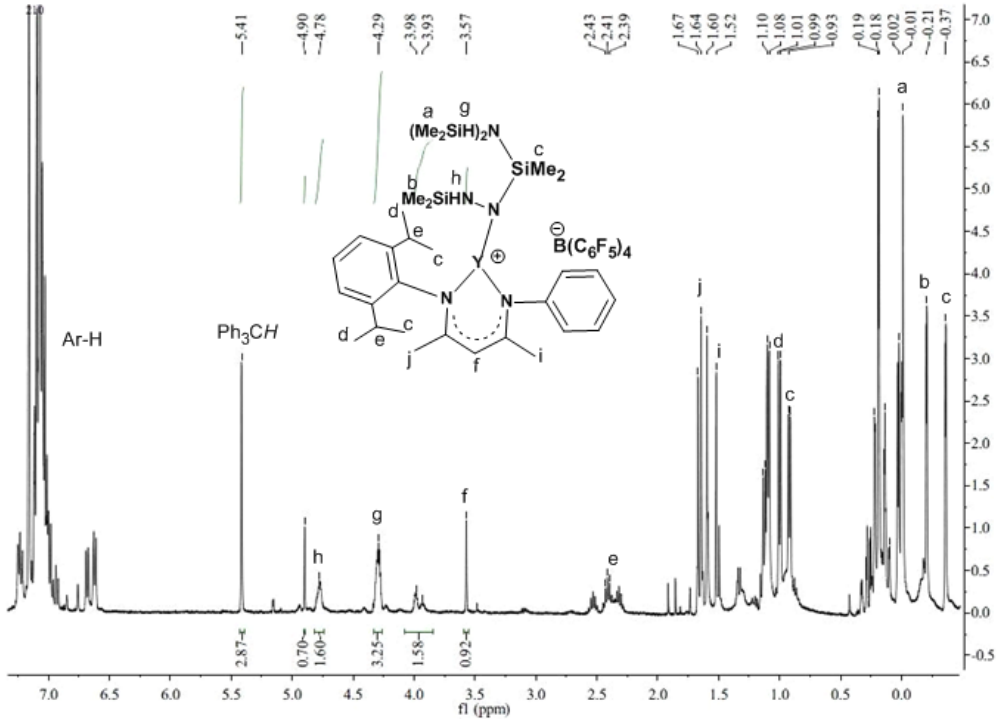

Figure S13. ^{1}H NMR spectrum of the reaction of complex **7** + 1 equiv of $[Ph_3C][B(C_6F_5)_4]$, 25 °C, after 30 min. (400 MHz, C_6D_5Cl+C_6D_6)