Supplementary Materials

Nickel-Catalyzed Ethylene Dimerization Based on PNP(NR$_2$)$_2$ Ligands

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Figure S1. ¹H NMR Spectrum of complex 1 (CDCl₃)
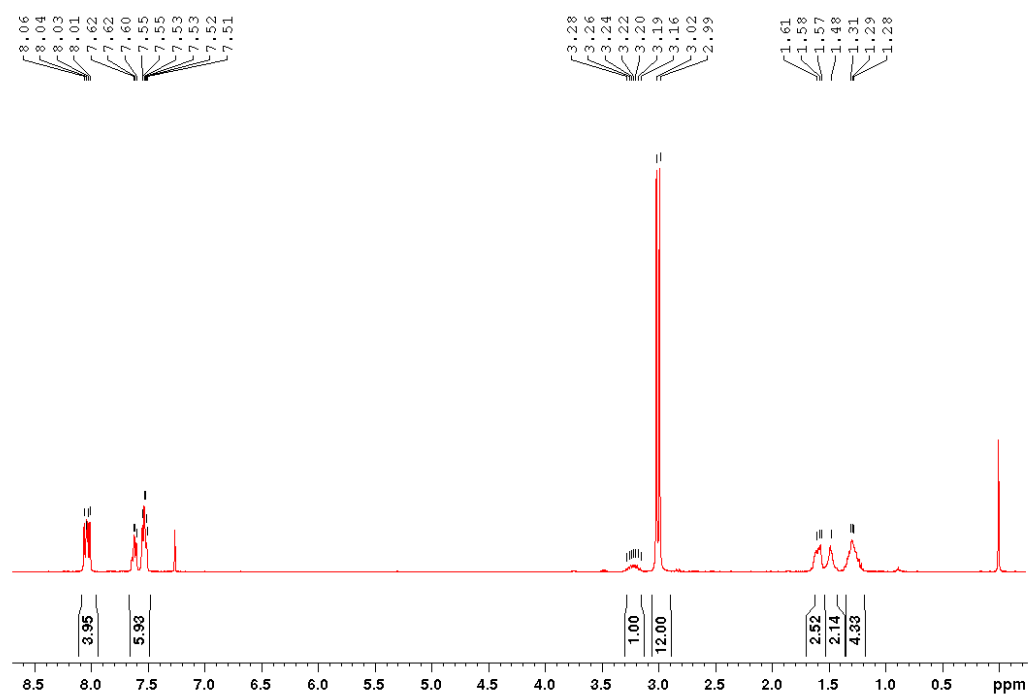
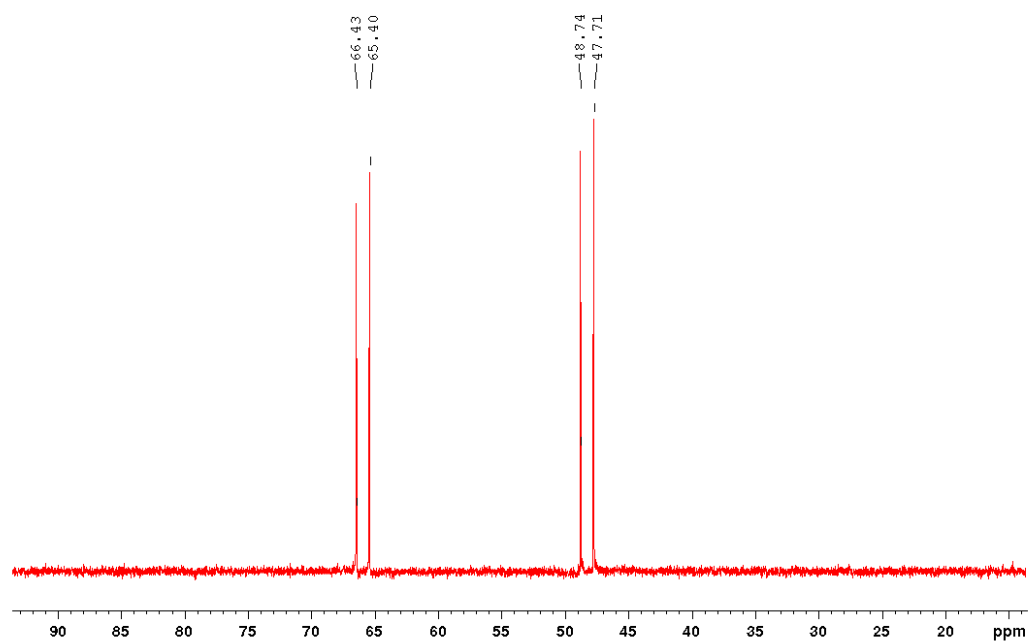**Figure S2. ^{31}P NMR Spectrum of complex 1 (CDCl$_3$)**

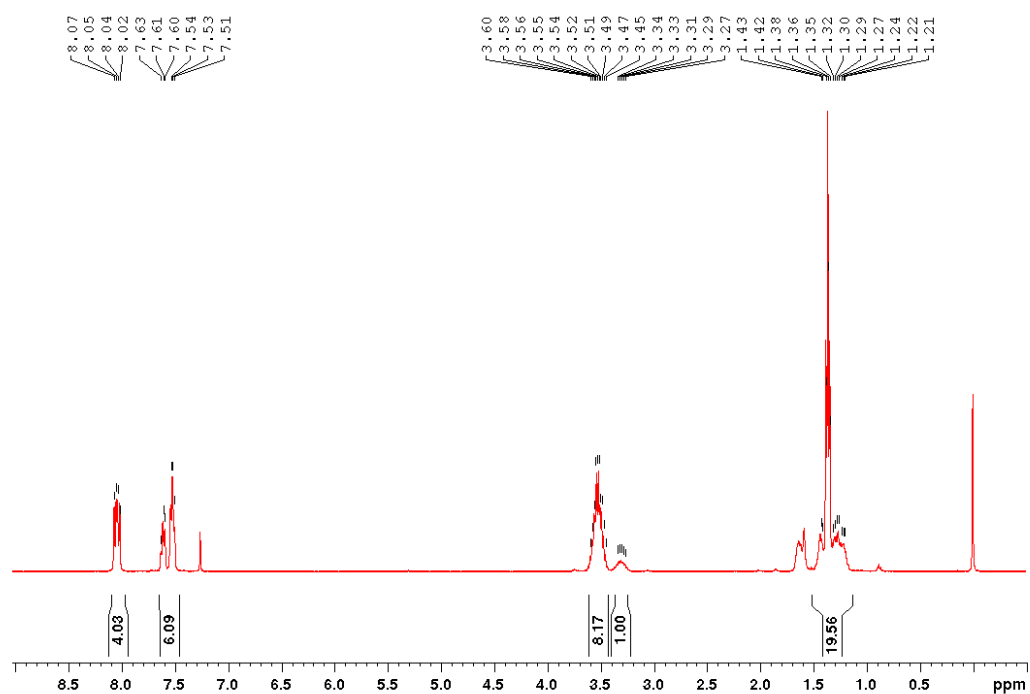**Figure S3. ¹H NMR Spectrum of complex 2 (CDCl₃)**

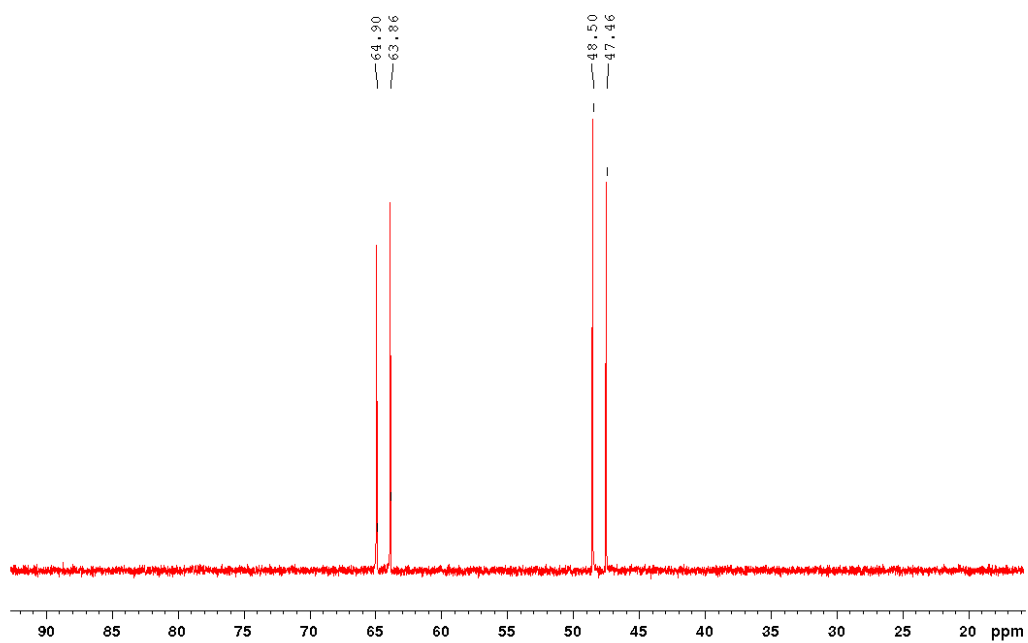**Figure S4. ^{31}P NMR Spectrum of complex 2 (CDCl$_3$)**

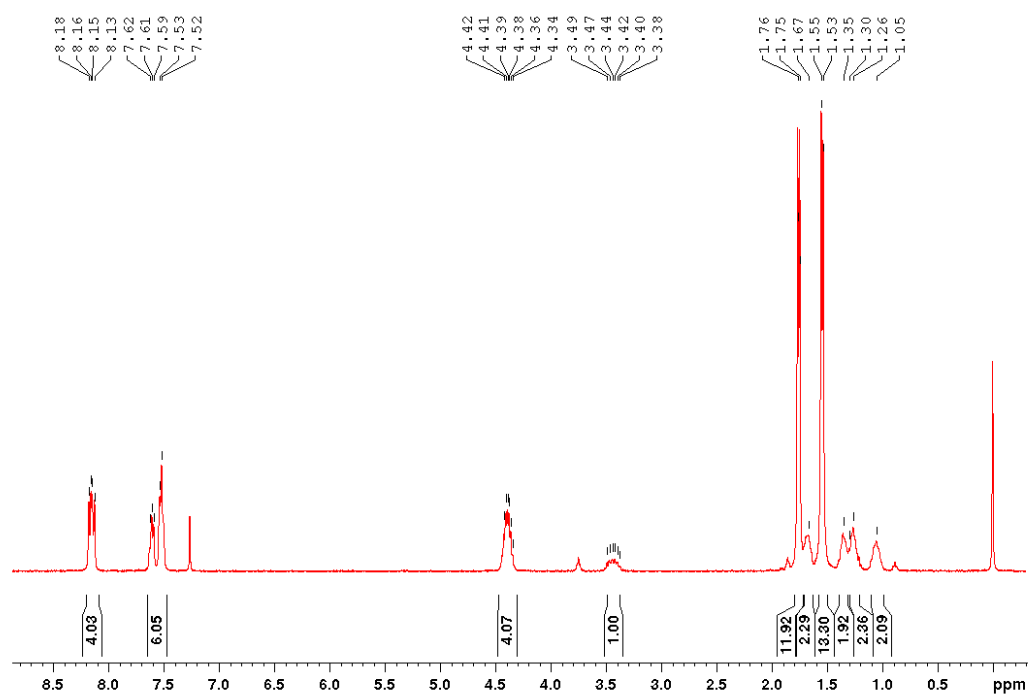**Figure S5. ¹H NMR Spectrum of complex 3 (CDCl₃)**
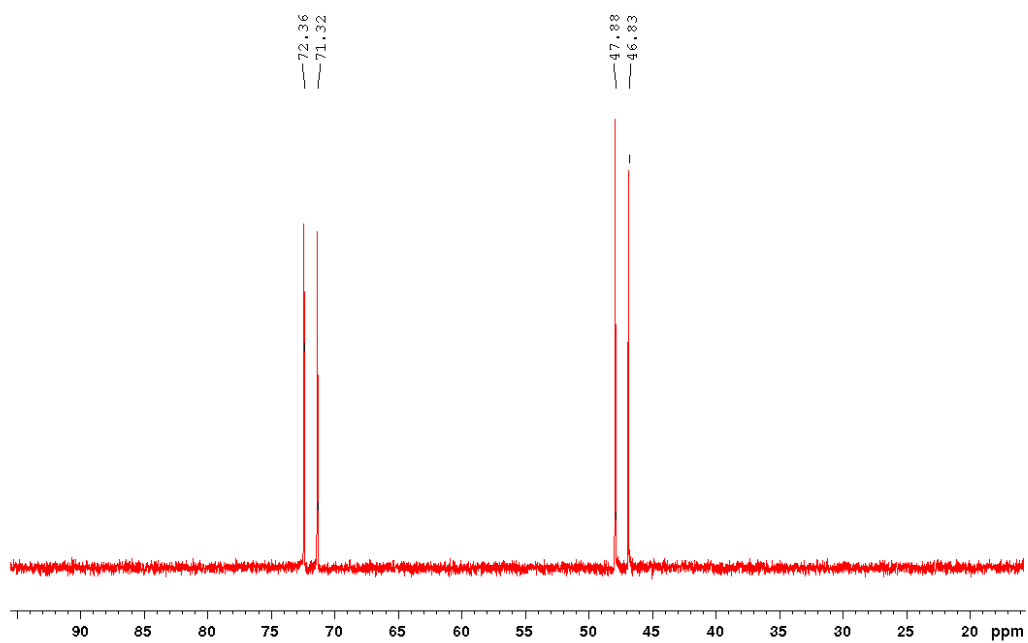
Figure S6. ^{31}P NMR Spectrum of complex 3 (CDCl₃)

Table S1. Crystallographic Determination Parameters for **1-3** Complexes

Complex	1	2	3
Empirical formula	$C_{21}H_{31}Br_2N_3NiP_2$	$C_{25}H_{39}Br_2N_3NiP_2$	$C_{29}H_{47}Br_2N_3NiP_2$
Formula weight	605.9	662.06	718.16
Temperature	113.15	113.15	113.15
Wavelength	0.71073	0.71073	0.71073
Crystal system, space group	Monoclinic, $P2_1/n$	Monoclinic, $P2_1$	Monoclinic, $P2_1$
Unit cell dimensions	$a = 9.4766(3)$ Å; $\alpha = 90°$ $b = 14.7740(4)$ Å; $\beta = 96.766(3)°$ $c = 17.6542(6)$ Å; $\gamma = 90°$	$a = 9.3488(4)$ Å; $\alpha = 90°$ $b = 15.3605(6)$ Å; $\beta = 103.789(4)°$ $c = 10.1924(4)$ Å; $\gamma = 90°$	$a = 10.1526(5)$ Å; $\alpha = 90°$ $b = 15.9976(9)$ Å; $\beta = 94.360(4)°$ $c = 19.0343(8)$ Å; $\gamma = 90°$
Volume	2454.50(13)	1421.47(10)	3082.6(3)
Z, Calculated density	4, 1.640 g·cm^{-3}	2, 1.547 g·cm^{-3}	4, 1.547 g·cm^{-3}
Absorption coefficient	4.190	3.625	3.349
F(000)	1224.0	676.0	1480.0
Theta range for data collection	4.646 to 65.878°	4.114 to 65.76°	4.024 to 56.564°
Limiting indices	$-13 \le h \le 13$ $-21 \le k \le 21$ $-25 \le l \le 26$	$-13 \le h \le 14$ $-20 \le k \le 22$ $-15 \le l \le 15$	$-13 \le h \le 13$ $-21 \le k \le 20$ $-24 \le l \le 25$
Reflections collected/unique	30638/8544[R(int)=0.0563]	18043/8291[R(int)=0.0509]	31127/7651[R(int)=0.0825]
Refinement method	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2
Data/restraints/parameters	8544/250/313	8291/1/303	7651/0/343
Goodness-of-fit on F^2	1.024	1.002	1.013
Final R indices [I > 2sigma(I)]	$R_1 = 0.0460$, $wR_2 = 0.0920$	$R_1 = 0.0433$, $wR_2 = 0.0791$	$R_1 = 0.0454$, $wR_2 = 0.0778$
R indices (all data)	$R_1 = 0.0767$, $wR_2 = 0.1049$	$R_1 = 0.0617$, $wR_2 = 0.0880$	$R_1 = 0.0844$, $wR_2 = 0.0894$