Supporting Information for:

Synthesis and Application of Binuclear α-Diimine Nickel/Palladium Catalysts with Conjugated Backbone

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Table S1. Crystallographic data for complex **C5**

data	**C5**
Empirical formula	$C_{66}H_{82}Cl_6N_4Pd_2$
Formula Wt	1356.86
Temp.(K)	120(2)
Crystsyst	orthorhombic
Space group	P b c a
a(Å)	19.3028(6)
b(Å)	14.8149(4)
c(Å)	23.5131(5)
α(deg)	90.00
β(deg)	90.00
γ(deg)	90.00
V(Å^3)	6724.0(3)
Z	4
D_t(Mg/m^3)	1.340
Abs coeff (mm^{-1})	0.814
F(000)	2800
Crystal size (mm)	0.46 × 0.42 × 0.38
θ range (deg)	2.88 to 25.500
Index ranges	-18=< h <= 23, -17=< k =<17, -28=< l =<23

No. of reflns collected	28239
No. of indepreflns	6248
Completeness to θ=25.5	0.998
Absorption correction	multi-scan
Max. and min. transmission	0.7474 and 0.7060
Refinement method	None
No. of data / restraints / params	6248/420/129
Goodness-of-fit on F^2	1.033
Final R indices [I>2σ(I)]	R1 = 0.0472, wR2 = 0.1124
R indices(all data)	R1 = 0.1296, wR2 = 0.1296

Table S2. Selected bond lengths (**Å**) and angles (deg) for **C5**

Bond lengths(**Å**)			Bond Angles(°)
Pd(1)-N(1)	2.085(3)	N(2)-C(1)-C(2)	119.1 (4)
Pd(1)-N(2)	2.136(2)	N(2)-C(1)-C(6)	117.9(4)
Pd(1)-Cl(1)	2.256(2)	Cl(1)-Pd(1)-N(2)	99.9(1)
Pd(1)-C(1)	2.035(20)	C(1)-Pd(1)-N(1)	92.5.7(5)
N(1)-C(18)	1.277(5)	Pd(1)-N(2)-C(13)	111.9(3)
N(1)-C(20)	1.440(5)	Pd(1)-N(1)-C(18)	113.2(3)
N(2)-C(1)	1.434(5)	N(1)-C(20)-C(25)	118.9(4)
N(2)-C(13)	1.283(5)	N(2)-C(20)-C(21)	117.7(4)

Table S3. Crystallographic data for complex**CP**

data	CP
Empirical formula	$C_{21}H_{22}Br_2N_4Ni$
Formula Wt	619.86
Temp.(K)	120(2)
Crystsyst	hexagonal
Space group	P 61 2
a(Å)	9.1161(2)
b(Å)	9.1161(2)
c(Å)	50.8316(9)
α(deg)	90.00
β(deg)	90.00
γ(deg)	120.00
V(Å^3)	3658.32(9)
Z	6
D_t(Mg/m^3)	1.688
Abs coeff (mm^{-1})	7.124
F(000)	1848.0
Crystal size (mm)	0.28 × 0.26 × 0.22

θ range (deg)	2.88 to 67.43
Index ranges	-10=< h <= 9, -10=< k =<10, -59=< l =<57
No. of reflns collected	13059
No. of indepreflns	2183
Completeness to θ=67.43	1.51
Absorption correction	multi-scan
Max. and min. transmission	0.240 and 0.303
Refinement method	None
No. of data / restraints / params	2183/140/140
Goodness-of-fit on F^2	1.028
Final R indices [I>2σ(I)]	R1 = 0.0228, wR2 = 0.0767
R indices(all data)	R1 = 0.0293, wR2 = 0.0767

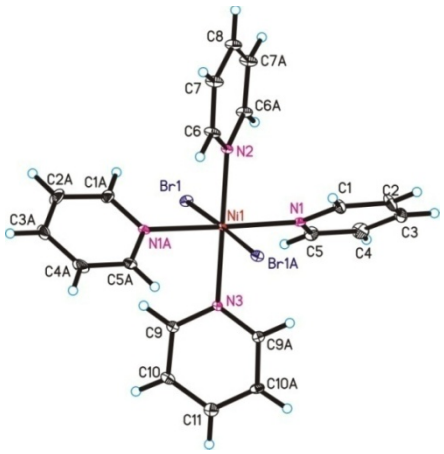

Figure S1. ORTEPdiagram of **CP**.Hydrogen atoms have been omitted for clarity.

Table S4. Selected bond lengths (**Å**) and angles (deg) for **CP**

Bond lengths(**Å**)			Bond Angles(°)
N(1)-Ni(1)	2.154(3)	N(1)-Ni(1)-N(2)	89.24 (8)
N(2)-Ni(1)	2.094(4)	N(1)-Ni(1)-N(3)	90.76(8)
N(3)-Ni(1)	2.121(4)	N(1)-Ni(1)-Br(1)	89.15(8)
N(1A)-Ni(1)	2.035(20)	N(1)-Ni(1)-Br(1A)	90.88(8)
Br(1)-Ni(1)	2.625(0)	N(1A)-Ni(1)-N(2)	89.24(8)
Br(1A)-Ni(1)	2.625(0)	N(1A)-Ni(1)-N(3)	90.79(8)
N(1)-C(1)	1.348(5)	N(1A)-Ni(1)-Br(1)	90.88(8)
N(1)-C(5)	1.342(5)	N(1A)-Ni(1)-Br(1A)	89.15(4)

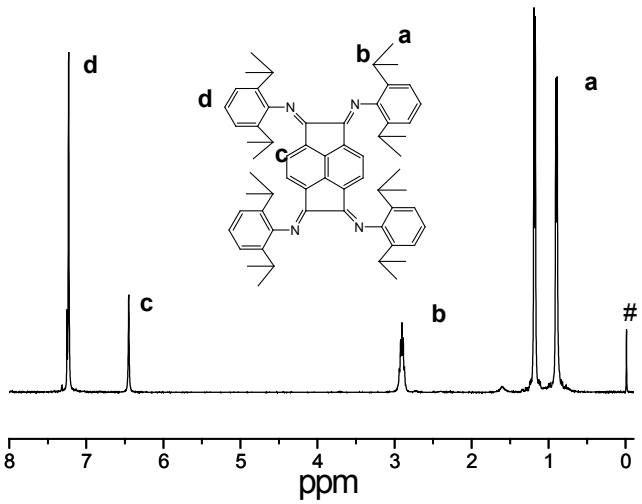

Figure S2.^{1}H-NMR of compound **L2** in $CDCl_3$(#,TMS).

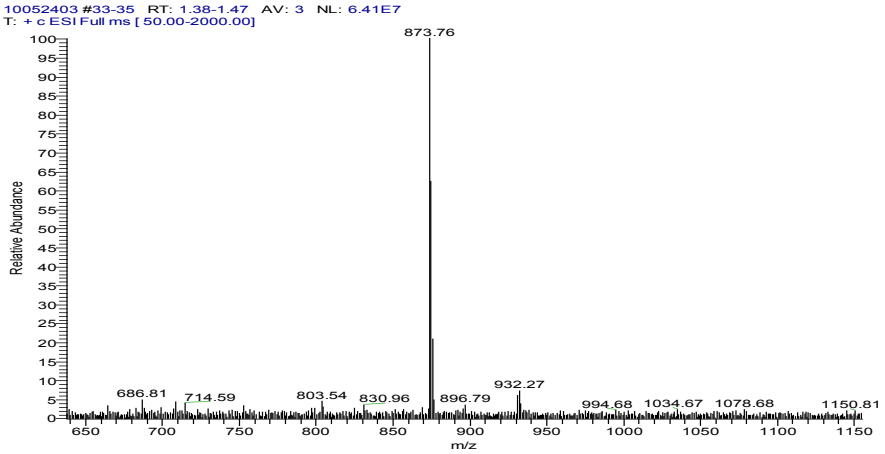

Figure S3.ESI-MS of compound **L2**.

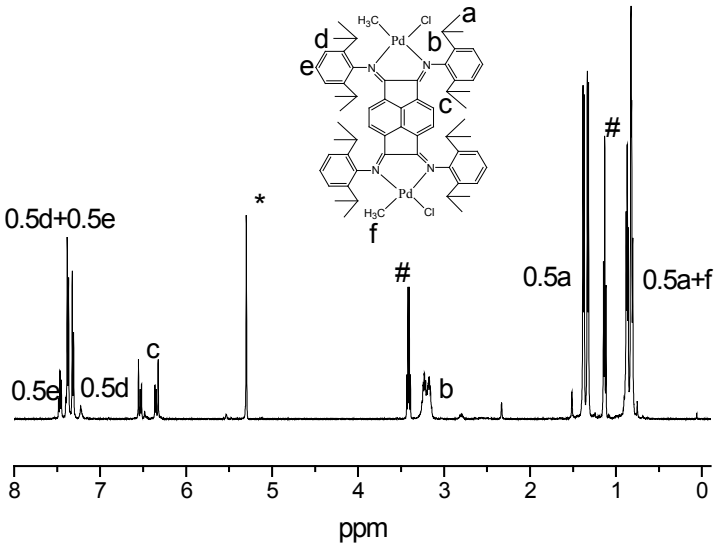

Figure S4.[1]H-NMR of catalyst **C5**in CD_2Cl_2 (#, $CH_3CH_2OCH_2CH_3$;*, CH_2Cl_2).

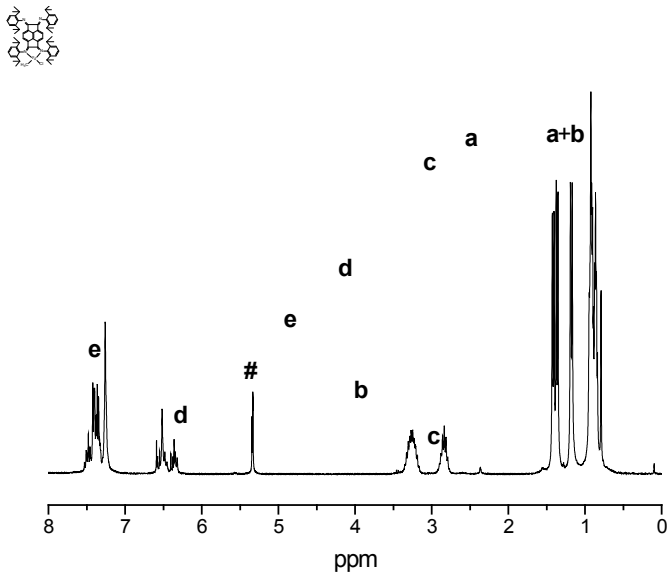

Figure S5.[1]H-NMR of catalyst **C3**in CD_2Cl_2 (#, CH_2Cl_2).

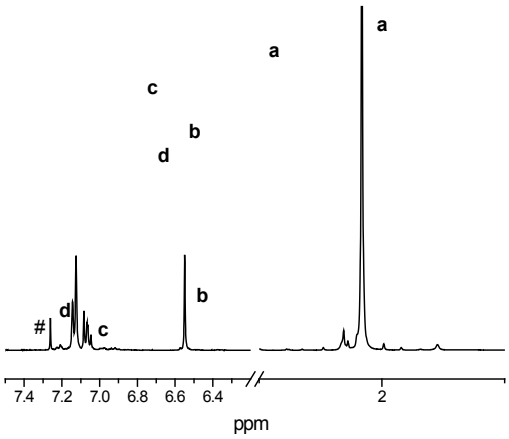

Figure S6.[1]H-NMR of compound **L1**in $CDCl_3$ (#, $CHCl_3$).

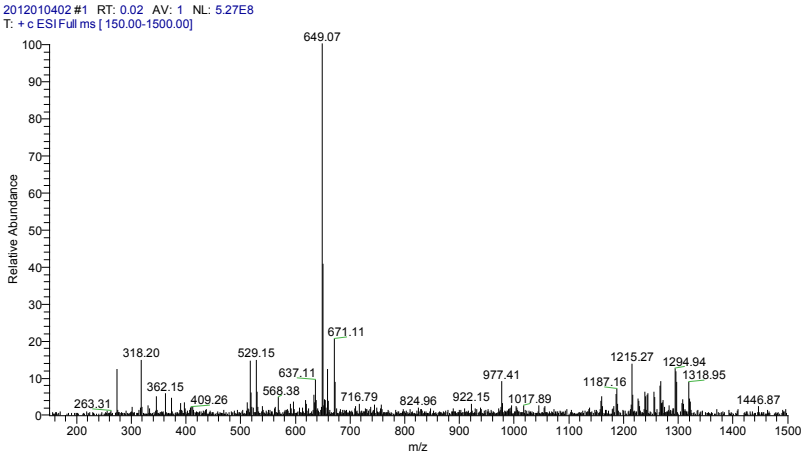

Figure S7.ESI-MS of compound **L1**.

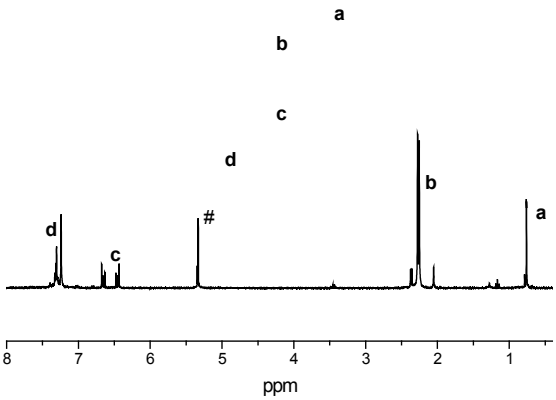

Figure S8.[1]H-NMR of catalyst **C4**in CD_2Cl_2 (#,CH_2Cl_2).

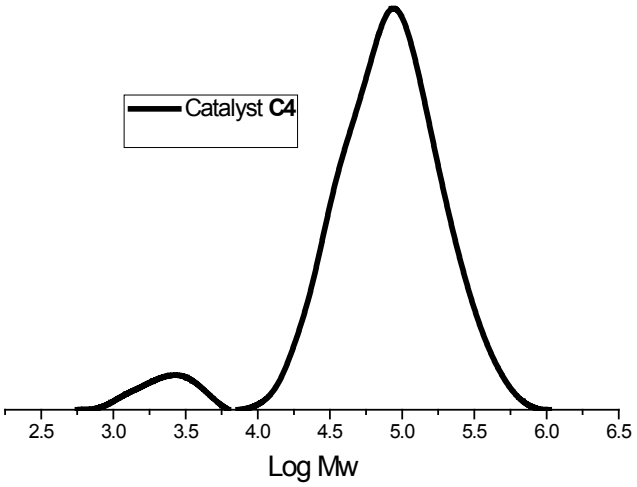

Figure S8.GPC curves of polyethylene prepared by catalyst **C4** with 2 equiv. of **Li**.