Supporting Information

The C–C Bond Forming Reaction Through Aldol-Type Addition Mediated by $[Ru_2(CO)_4]^{2+}$ Core

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Table S1. Selected Bond Distances (Å) and Bond Angles (°) in $[Ru_2(CO)_4(L1)_2][BF_4]_2$ (**2**)•$(CH_3)_2CO$.

Bond Distances			
Ru1-Ru1	2.6103(17)	Ru1-N2	2.131(8)
Ru1-O3	22.244(6)	Ru1-C1	1.867(12)
Ru1-N1	2.189(8)	Ru1-C2	1.856(11)
Bond Angles			
O3-Ru1-Ru1	165.67(18)	C2-Ru1-N2	93.2(4)
N1-Ru1-Ru1	82.3(2)	C1-Ru1-N2	175.3(4)
N2-Ru1-Ru1	82.3(2)	C2-Ru1-N1	175.4(4)
N1-Ru1-N2	89.6(3)	C2-Ru1-C1	87.8(4)
N1-Ru1-O3	88.7(3)	C1-Ru1-O3	97.9(3)
N2-Ru1-O3	86.5(3)	C2-Ru1-O3	95.1(3)
C1-Ru1-N1	89.1(4)		

Table S2. Selected Bond Distances (Å) and Bond Angles (°) in $[Ru_2(CO)_4(L1)_2][OTf]_2$ (**2a**)•$(CH_3)_2CO$.

Bond Distances			
Ru1-Ru1	2.6343(7)	Ru1-N2	2.159(3)
Ru1-O3	2.241(3)	Ru1-C1	1.859(4)
Ru1-N1	2.190(4)	Ru1-C2	1.848(5)
Bond Angles			
O3-Ru1-Ru1	165.12(9)	C2-Ru1-N2	95.11(16)
N1-Ru1-Ru1	81.56(9)	C1-Ru1-N2	177.47(16)
N2-Ru1-Ru1	85.68(9)	C2-Ru1-N1	173.09(16)
N1-Ru1-N2	87.20(13)	C2-Ru1-C1	87.25(18)
N1-Ru1-O3	87.46(13)	C1-Ru1-O3	96.76(16)
N2-Ru1-O3	83.77(13)	C2-Ru1-O3	99.26(16)
C1-Ru1-N1	90.35(16)		

Table S3. Selected Bond Distances (Å) and Bond Angles (°) in $[Ru_2(CO)_4(L2)_2][BF_4]_2$ (**3**).

Bond Distances			
Ru1-Ru2	2.6096(10)	Ru2-O6	2.233(6)
Ru1-O5	2.230(6)	Ru2-N2	2.171(7)
Ru1-N1	2.193(7)	Ru2-N4	2.172(6)
Ru1-N3	2.175(7)	Ru2-C3	1.841(9)
Ru1-C1	1.854(10)	Ru2-C4	1.853(9)
Ru1-C2	1.857(9)		
Bond Angles			
O5-Ru1-Ru2	163.01(15)	O6-Ru2-Ru1	165.65(15)
N1-Ru1-Ru2	81.81(18)	N2-Ru2-Ru1	85.61(18)
N3-Ru1-Ru2	85.87(19)	N4-Ru2-Ru1	82.00(19)
N1-Ru1-N3	84.6(2)	N2-Ru2-N4	84.7(3)
N1-Ru1-O5	86.5(2)	N2-Ru2-O6	83.4(3)
N3-Ru1-O5	80.8(2)	N4-Ru2-O6	87.8(2)
C1-Ru1-N1	173.2(3)	C3-Ru2-N2	171.9(3)
C1-Ru1-N3	98.3(3)	C3-Ru2-N4	87.4(3)
C2-Ru1-N1	90.2(3)	C4-Ru2-N2	100.1(3)
C2-Ru1-N3	174.8(3)	C4-Ru2-N4	172.9(3)
C1-Ru1-C2	86.7(4)	C3-Ru2-C4	87.5(4)
C1-Ru1-O5	100.0(3)	C3-Ru2-O6	98.4(3)
C2-Ru1-O5	99.8(3)	C4-Ru2-O6	97.8(3)

Table S4. Selected Bond Distances (Å) and Bond Angles (°) in $[Ru_2(CO)_4(L3)_2][BF_4]_2$ (**4**).

Bond Distances			
Ru1-Ru1	2.6128(12)	Ru1-N2	2.189(6)
Ru1-O3	2.224(5)	Ru1-C1	1.858(8)
Ru1-N1	2.157(6)	Ru1-C2	1.856(7)
Bond Angles			
O3-Ru1-Ru1	166.43(13)	C2-Ru1-N2	174.5(3)
N1-Ru1-Ru1	81.81(15)	C1-Ru1-N2	89.4(2)
N2-Ru1-Ru1	82.73(14)	C2-Ru1-N1	94.8(3)
N1-Ru1-N2	87.7(2)	C2-Ru1-C1	87.8(3)
N1-Ru1-O3	87.3(2)	C1-Ru1-O3	96.0(3)
N2-Ru1-O3	88.84(19)	C2-Ru1-O3	96.1(3)
C1-Ru1-N1	175.6(3)		

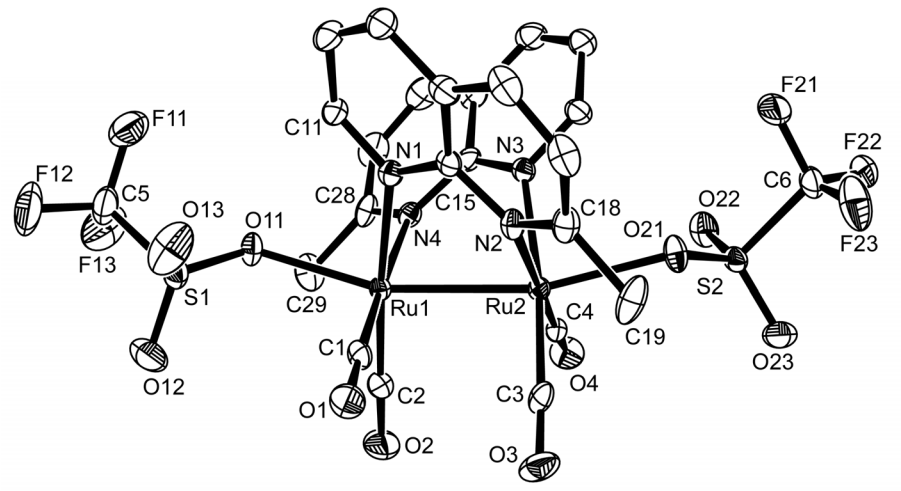

Figure S1. ORTEP diagram (50% probability thermal ellipsoids) of the molecular structure of $[Ru_2(CO)_4(2\text{-MeNP})_2(OTf)_2]$ (**1a**) with important atoms labeled. Hydrogen atoms are omitted for the sake of clarity. Crystal data: formula $C_{24}H_{16}F_6N_4O_{10}Ru_2S_2$, crystal system orthorhombic, space group Pbca, a = 13.3005(10) Å, b = 14.1940(11) Å, c = 33.341(2) Å, V = 6294.4(8) $Å^3$, R1 = 0.0528, wR1 = 0.1039, goodness-of-fit 1.222. Important bond lengths (Å) and angles (°). Ru1-Ru2 2.5994(4), Ru1-O11 2.240(3), Ru2-O21 2.285(3), Ru1-Ru2-O21 165.35(8), Ru2-Ru1-O11 163.21(8), N1-Ru1-Ru2 80.76(8), N3-Ru1-Ru2 84.45(8), N2-Ru2-Ru1 84.51(8), N4-Ru2-Ru1 80.79(9).

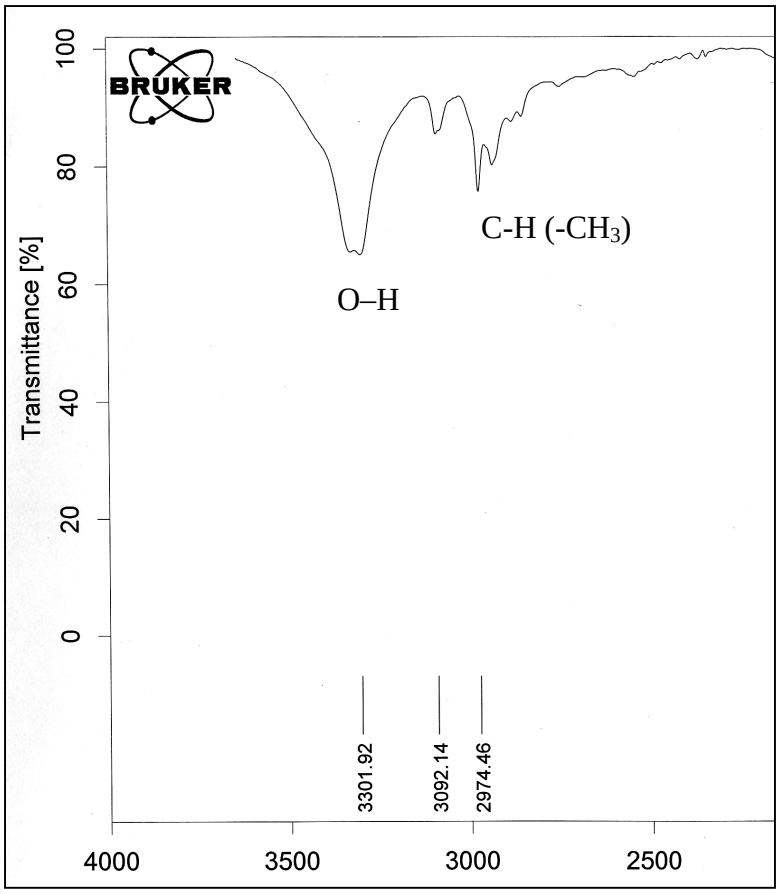

Figure S2. IR spectrum showing band at 3302 cm^{-1} corresponding to the stretching frequency of hydroxyl group (-OH) in compound **3**.

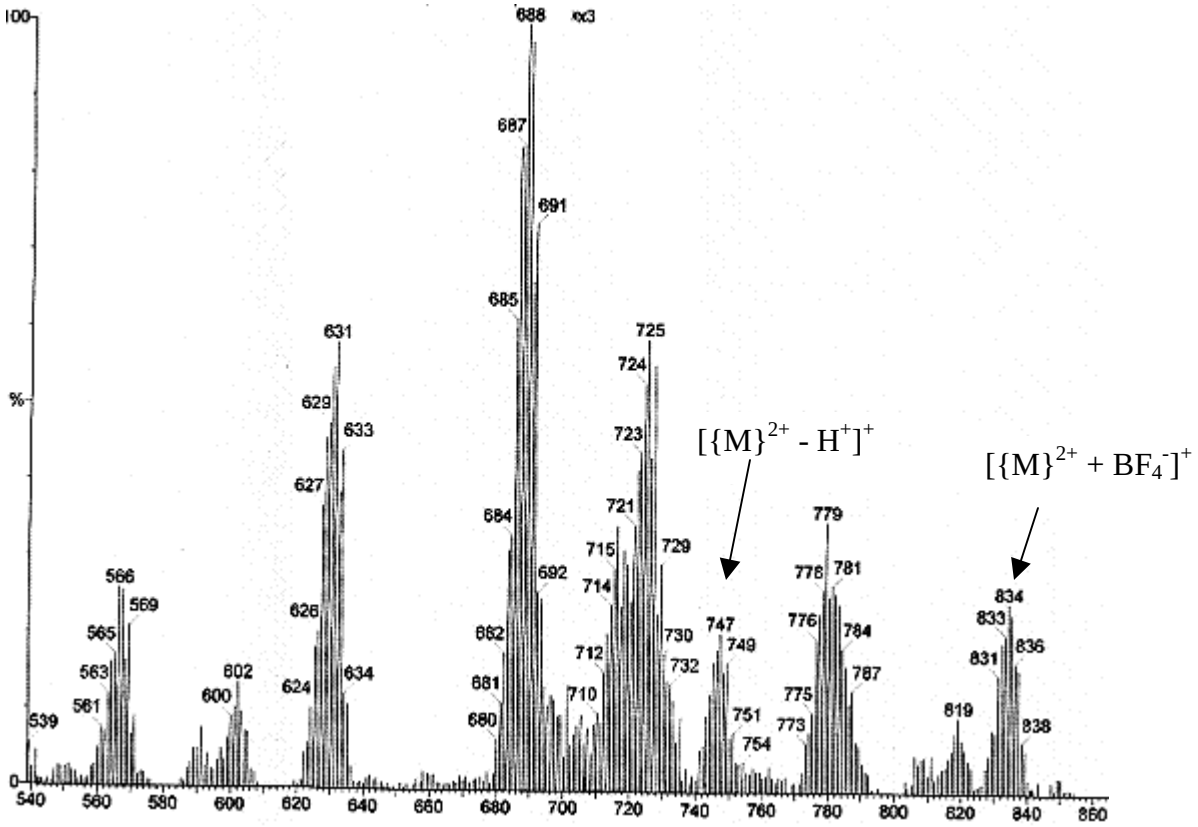

Figure S3. ESI-MS spectrum of compound **3** in CH_3CN.