

Electronic Supplementary Information

Rhodium-calix[4]pyrrole and Rhodium-tetraphenyl porphyrin: Preparation, surface grafting and its catalytic application on nitro-benzene reduction

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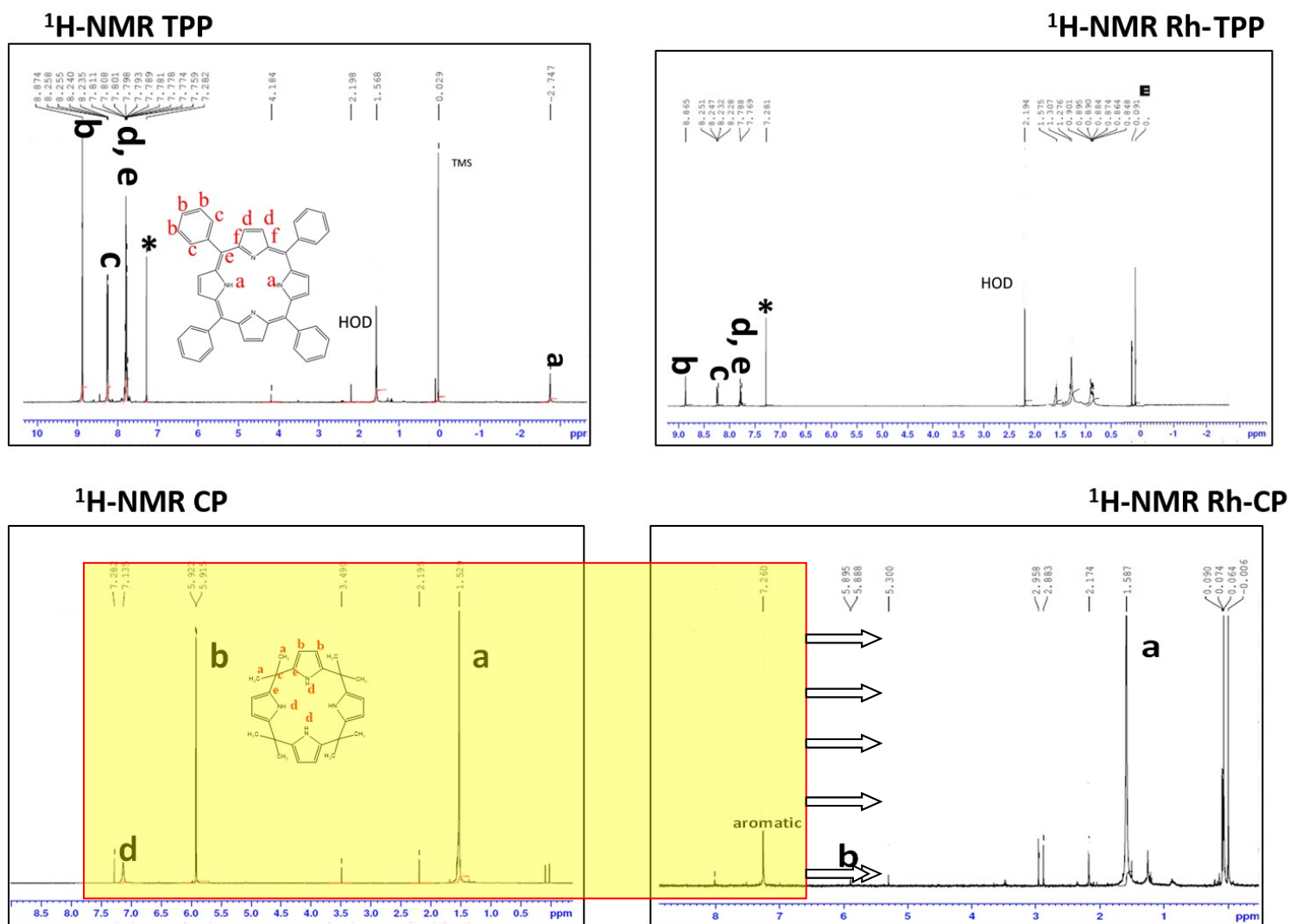


Fig. S1. ¹H NMR spectra of TPP, Rh-TPP, CP, Rh-CP

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Table S1. Snapshot of CHNS Analysis

CP=Calix[4]pyrrole (7), TPP= Tetraphenyl porphyrin (8), Rh-TPP=Rhodium incorporated TPP (9), Rh-CP=Rhodium incorporated CP(10), Rh-CP-SBA-15-F= Rh-CP grafted on diamino functionalised SBA-15 (11), Rh-TPP-SBA-15-F== Rh-TPP grafted on diamino functionalised SBA-15 (12)


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No.	Weight..	Name	N [%]	C [%]	H [%]	S [%]	Date Time	Name: eassuperuser, Access: VarioMICRO superuser 08-03-2018 09:32:01 varioMICRO V3.1.0 (f85d762) 2013-04-26, CHNS Mode, Ser. No.: 15133023 Elementar Analysensysteme GmbH Page 1 (of 1)	
1	1.0000	Blank	0.00	0.00	0.000	0.000	08.03.2018 10:...		
2	1.0000	Blank	0.00	0.00	0.000	0.000	08.03.2018 11:...		
3	1.0000	Blank	0.00	0.00	0.000	0.000	08.03.2018 11:...		
4	5.0000	Runin	14.77	37.79	3.761	16.224	08.03.2018 11:...		
5	4.8020	Runin	14.80	37.85	3.820	16.526	08.03.2018 11:...		
6	2.3400	sulfanilamide	16.26	41.85	4.690	18.620	08.03.2018 11:...		
7	2.5840	sulfanilamide	16.26	41.85	4.690	18.620	08.03.2018 11:...		
8	2.9500	TPP	9.17	85.35	4.987	0.000	08.03.2018 12:...		→ Tetraphenyl porhyri
9	2.4650	CP	13.03	78.83	5.80	0.000	08.03.2018 12:...		→ Calix[4]pyrrole
10	3.7320	Rh-CP	9.95	59.95	5.80	0.000	08.03.2018 12:...		→ Rh incorporated CP
11	3.0800	Rh-CP-SBA-15-F	6.46	60.95	3.435	0.000	08.03.2018 12:...		→ Rh-CP grafted on diamino functionalised SBA-15
12	2.1180	Rh-TPP-SBA-15-F	5.77	60.72	4.171	0.000	08.03.2018 12:...		→ Rh-TPP grafted on diamino functionalised SBA-15
13	2.2080	Rh-CP-SBA-15-F*	5.04	60.35	3.152	0.000	08.03.2018 13:...		→ Rh-CP grafted on diamino functionalised SBA-15 after reaction
14	3.0840	Rh-TPP-SBA-15-F*	5.77	60.24	2.719	0.000	08.03.2018 13:...		→ Rh-CP grafted on diamino functionalised SBA-15 after reaction
15	2.3980	Rh TPP	7.50	70.67	4.10	0.000	08.03.2018 13:...		
16	1.8570	RCo 2	0.06	0.46	3.956	11.774	08.03.2018 13:...		

Table S2. Snapshot of CHNS Analysis

TPP= Tetraphenyl porphyrin (8), CP=Calix[4]pyrrole (9), Rh-CP=Rhodium incorporated CP(10), Rh-CP-SBA-15-F= Rh-CP grafted on diamino functionalised SBA-15 (11), Rh-TPP-SBA-15-F= Rh-TPP grafted on diamino functionalised SBA-15 (12), Rh-CP-SBA-15-F*= Rh-CP grafted on diamino functionalised SBA-15 after catalytic reaction (13), Rh-TPP-SBA-15-F*= Rh-TPP grafted on diamino functionalised SBA-15 after catalytic reaction (14) Rh-TPP=Rhodium incorporated TPP (15)

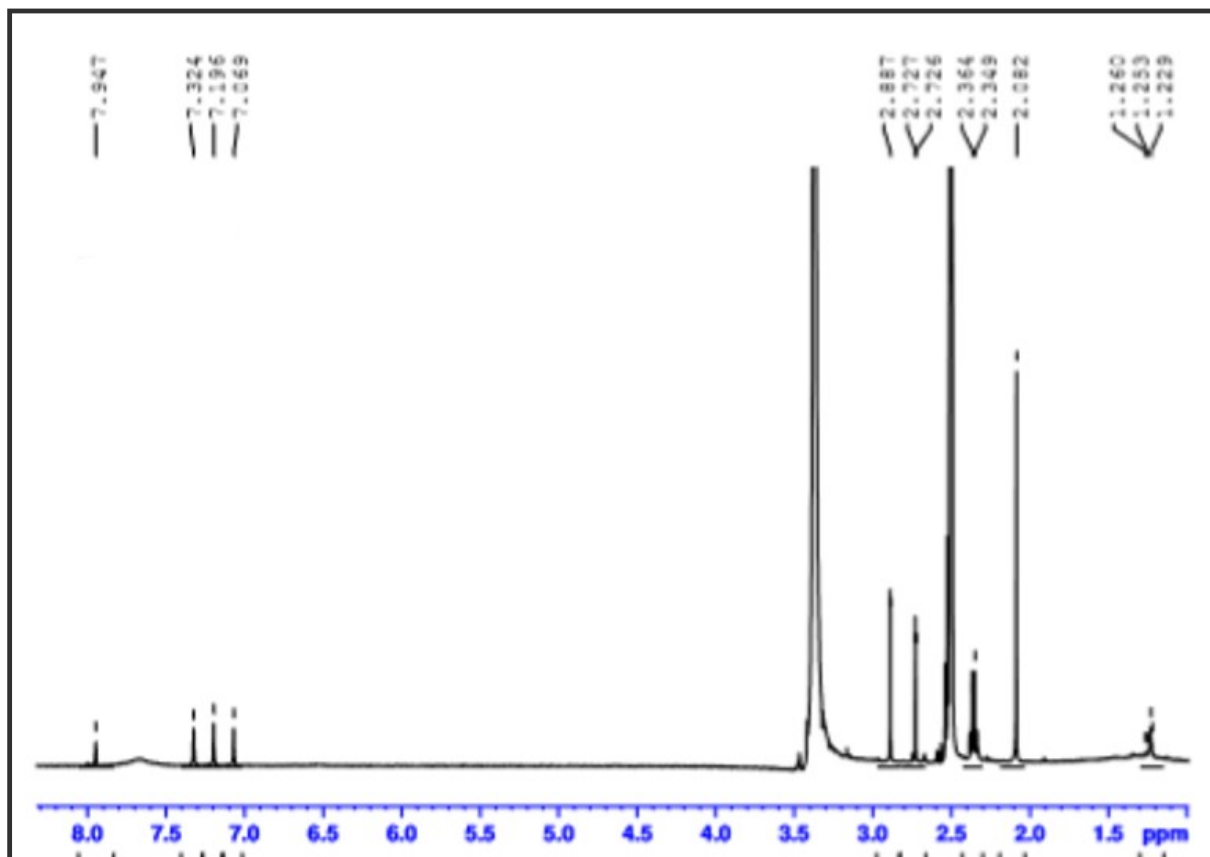


Fig S2. ^1H NMR of poly-pyrrole formed during the preparation of Calix[4]pyrrole and Tetraphenyl porphyrin under normal atmospheric condition.

Table S3. Comparative study of existing reported catalytic system.

Sl. No	Catalyst	Nitroarene	Conv. (%)	Sel. (%)	Reaction condition	Ref.
1	SBA-15-F-RhCP SBA-15-F-RhTPP	Aromatic nitrobenzene	>95	>90	Hydrazine, isopropyl alcohol, 80 °C;	Present work
2	CoNC	Nitrotriptycene	95	95	NaBH ₄ , DCM, RT.	16d
3	Au-Organic-inorganic hybride SiO ₂	Aromatic Nitrobenzene	>90	>90	40 atm H ₂ pressure, EtOH, 100-140 °C	23a
4	Ru-Reduced graphine oxide	Aromatic Nitrobenzene	60-100	90-99	20 atm H ₂ Pressure, EtOH-H ₂ O, 110 °C	23b

5	FeSO ₄ -Fe phthalocyanine	Aromatic nitrobenzene	60-99	82	Hydrazene, EtOH-H ₂ O, 120 °C	23c
6	Zn-Phthalocyanin	Aromatic nitrobenzene	80-99	99	Hydrazene, PEG-4000, 100 °C	23d
7	Pinacol, MoO ₂ Cl ₂ (dmf) ₂	Aromatic nitrobenzene	95	94	Toluene, 150 °C	23e
8	Fe(acac) ₃	Aromatic nitrobenzene	99	>90	MW, 150 °C	23f
