Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting information

Truxene-based porous polymers: From synthesis to catalytic activity

Table of contents

Figure S1. Photographs and microphotographs obtained with a Nikon microscope Eclipse LV 100 POL of polymers TxPP (a,b) and TXBNPP (c,d)

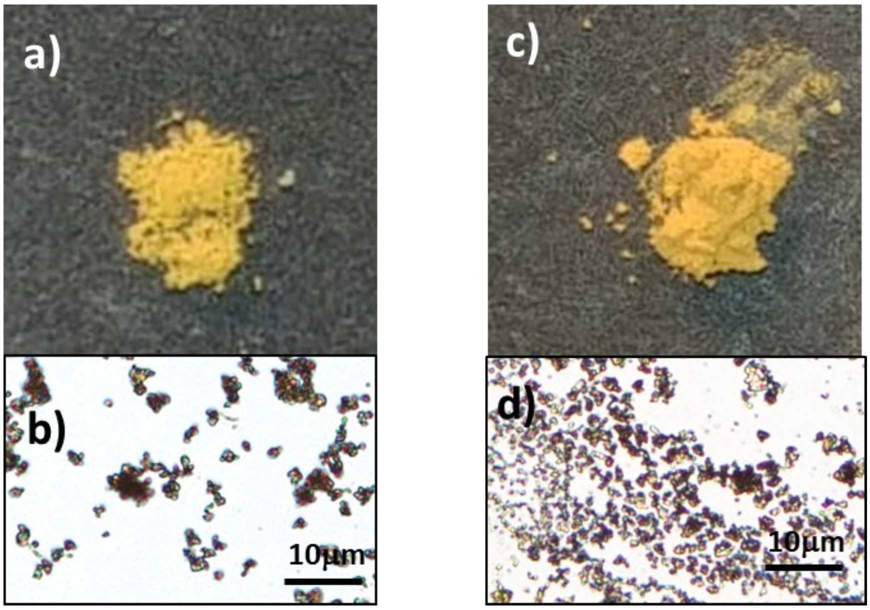


Figure S2. Comparison of the FT-IR spectra of the new porous polymers (TxPP and TxBnPP) with that of the monomer TXMe.

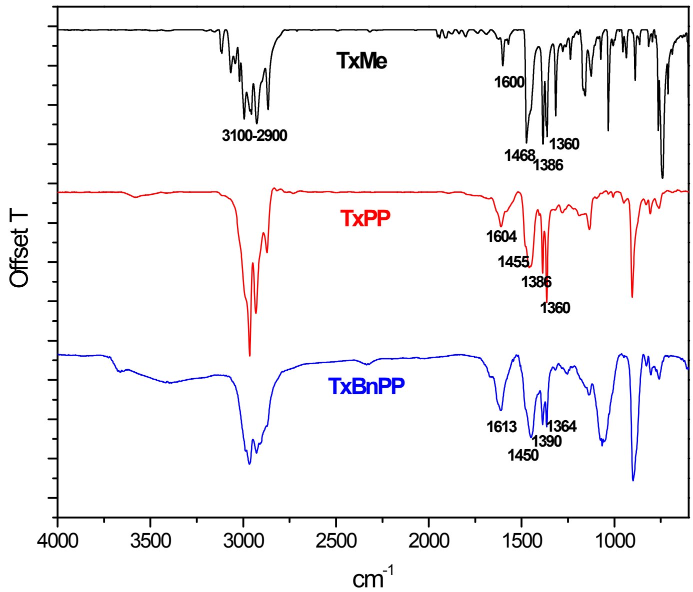


Table S1. Elemental analysis of hexamethyl-truxene based porous polymers.

Material	Yield (%)	**Exp. (%)**			
		C	**H**	**N**	**S**
TxPP (Calculated for $C_{36}H_{33}$ as repeat unit)		92.30	7.05		
TxPP ($FeCl_3$)	90	80.40	6.70	-	-
TxPP ($AlCl_3$)	99	85.26	6.80	-	-
TxPP-SO_3H		61.13	5.54	-	5.16
TxPP-SO_3H-NO_2		59.66	5.26	1.76	3.03
TxPP-SO_3H-NH_2		61.81	5.30	1.51	2.49
TxPP-NO_2		66.13	4.54	3.46	-
TxPP-NH_2		57.43	4.57	2.51	-
TxBnPP (Calculated for $C_{45}H_{39}$ as repeat unit)		93.75	6.25		
TxBnPP ($FeCl_3$)	90	80.00	4.51	-	
TxBnPP ($AlCl_3$)	99	86.62	5.69	-	-

Table S2. Porous properties of PPs based on hexamethyl-truxene prepared from $FeCl_3$.

Polymer	S_{BET} ($m^2.g^{-1}$)	Pore volume ($cm^3.g^{-1}$)[a]	Pore size (nm)
TxPP ($FeCl_3$)	852	0.639	3.00
TxBnPP ($FeCl_3$)	835	0.732	3.50

[a] At P/P_0= 0.987

Figure S3. Pore distribution of polymers by N_2-DFT methods

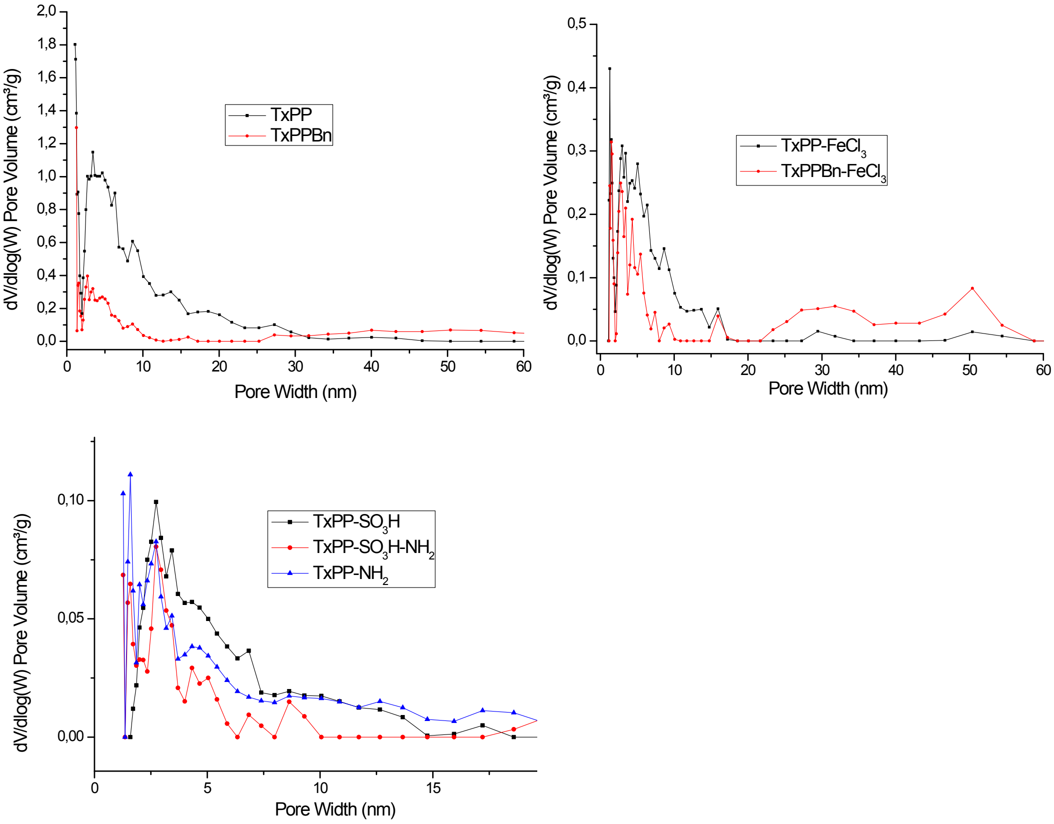


Figure S4. TGA of TxPP in argon and oxygen atmosphere

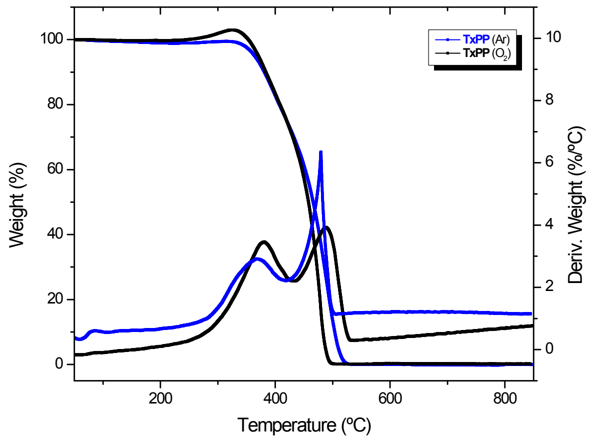


Figure S5. Powder XRD of TxPP.

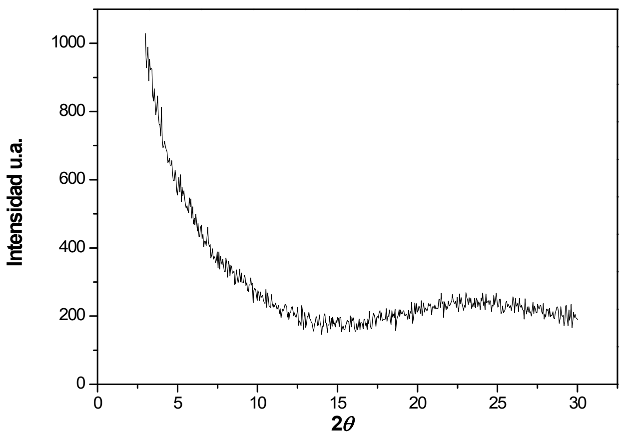


Figure S6. TGA of functionalized TxPP in oxygen atmosphere

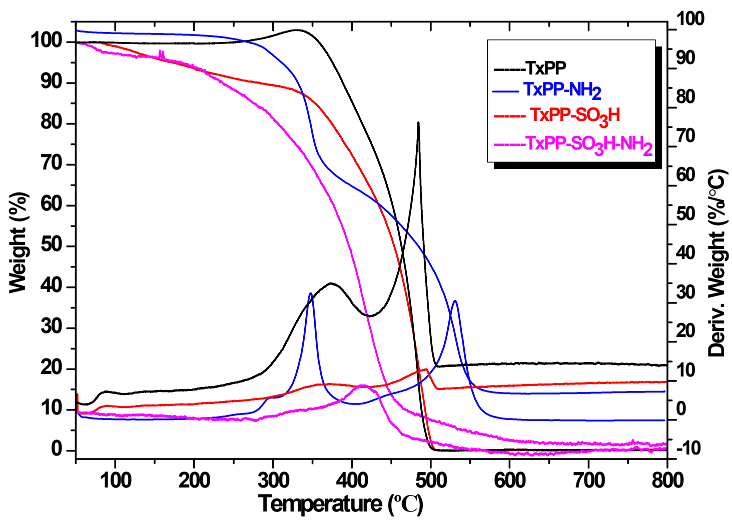
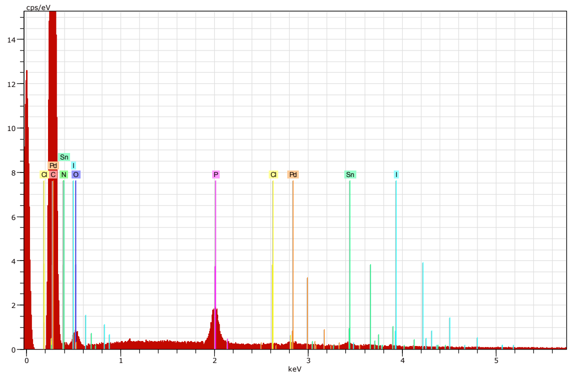


Figure S7. EDX analysis for TxPP-NH_2



El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error [wt.%]
C	6	K-series	91.90	91.90	95.17	10.1
N	7	K-series	0.00	0.00	0.00	0.0
O	8	K-series	5.07	5.07	3.94	0.9
P	15	K-series	1.82	1.82	0.73	0.1
Cl	17	K-series	0.10	0.10	0.03	0.0
Sn	50	L-series	0.35	0.35	0.04	0.0
I	53	L-series	0.26	0.26	0.03	0.0
		Total:	100.00	100.00	100.00	

Catalytic activity

Figure S8. Kinetic profile for TxPP-fotocatalyzed oxidative coupling of benzylamine, effect of polymer.

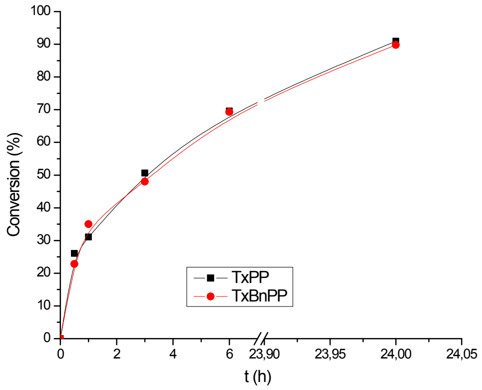
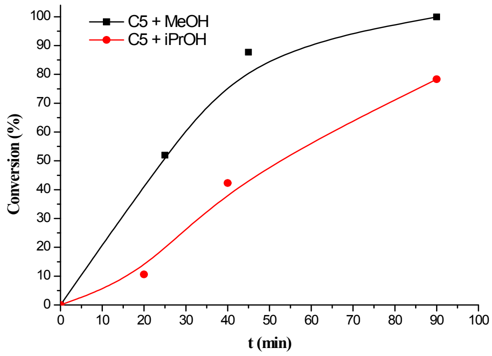


Figure S9. Kinetic profile for TxPP-SO_3H-catalyzed esterification: a) effect of alcohol, b) Influence of chain length.

a)



b)

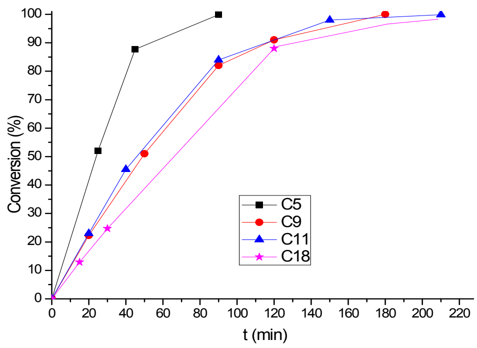


Figure S10. Hot filtration experiment.

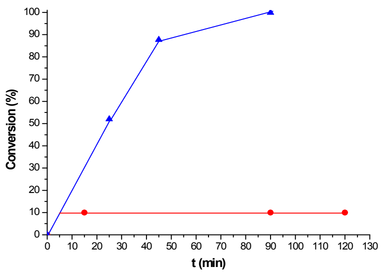


Figure S11. FTIR spectrum of recovered catalyst after photocatalytic reaction.

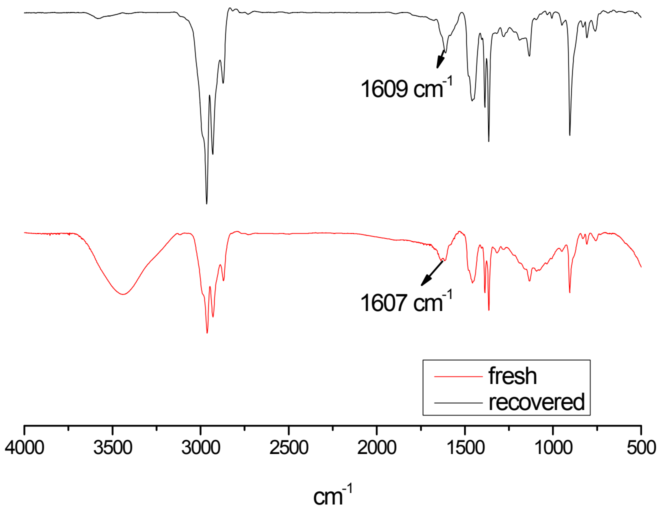
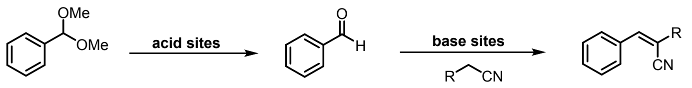


Table S3. Tandem deprotection-Knoevenagel Condensation Cascade Reaction.



1 2 3

Entry	Catalyst	R	t (h)	Conversion (%)	Yield GC (%)	
				4	5	6
1	TxPP-SO_3H-NH_2 [a]	CN	1	100	31.5	68.5
2	TxPP-SO_3H-NH_2 [a]	-	20	-	-	100
3	PPAF-SO_3H-NH_2[1]	CN	1	100	0	100
4	30-MLHM-NH_2-SO_3H[2]	COOEt	18	97	4.5	91.9
5	MONNs–SO_3H–NH_2[3]	CN	2	99	0	99
6	TxPP-SO_3H + TxPP-NH_2 [a]	CN	1	100	24.8	75.2
7	PPAF-SO_3H + PPAF-NH_2[1]	CN	1	100	9	91
8	PPAF1-SO_3H+PPAF1-NH_2[4]	CN	1	100	13	87
9	HCPs–SO_3H–50 + HCPs–CH_2NH_2–50[5]	CN[d]	7	100	trace	97
10	MONNs–SO_3H +MONNs–NH_2[3]	CN	2	98	6	92
9	PTSA + Aniline[b]	CN	10	94	70	24
10	IR-120 + A-21[c]	CN	10	10	0	10
11	TxPP [a]	CN	24	-	-	-

[a]Reaction conditions: benzaldehyde dimethyl acetal (0.36 mmol), malononitrile (0.43 mmol), catalyst (10 mol% referred to base sites), toluene (2 mL) + H_2O (25 µL), 90ºC; [b] p-toluen sulfonic acid (PTSA, 10 mol%) + Aniline (10 mol%); [c]10 mol%substract, [d]2-(2-bromophenyl)-1,3-dioxolane.

[1] E. Merino, E. Verde-Sesto, E. M. Maya, A. Corma, M. Iglesias, F. Sánchez *Applied Catalysis A: General* 2014, **469**, 206– 212.
[2] A. Gaona, U. Díaz, A. Corma *Chem. Mater.* 2017, **29**, 1599−1612.
[3] T.Wang, Y. Xu, Z. He, H. Zhang, L. Xiong, M. Zhou, W. Yu, B. Shi, K. Huang *Macromol. Chem. Phys.*, 2017, DOI: 10.1002/macp.201600431
[4] E. Merino, E. Verde-Sesto, E. M. Maya, M. Iglesias, F. Sánchez, *Chem. Mat.* 2013, **25**, 981−988.
[5] K. Wang, Z. Jia, X. Yang, L. Wang, Y.Gu, B. Tan *J. of Catal.* 2017, **348**, 168–176.