Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Imidazole-functionalized polymer microspheres and fibers – useful materials for immobilization of oxovanadium(IV) catalysts

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Synthesis of polystyrene-co-vinylimidazole copolymers

p(ST-co-VIM)_3-1. VIM (2.0 g) was mixed with styrene (6.0 g) followed by addition of AIBN (0.2 wt%) (Scheme 2). The vial was sealed, purged with argon and the temperature increased to 60^{o}C. The reaction was allowed to proceed at this temperature for 48 hrs. The resultant solid polymer was subsequently dissolved in warm chloroform and precipitated by addition of methanol. This precipitation process was repeated twice to ensure removal of unreacted monomers. The white polymer was dried in an oven for 48 hrs at 60^{o}C.

p(ST-co-VIM)_5-1. The synthesis of this polymer is the same as p(ST-co-VIM) reported within the manuscript.

p(ST-co-VIM)_7-1. The same as for p(ST-co-VIM)_3-1 except that VIM (1.0 g) and styrene (7.0 g) was used.

Pertinent characterization data of the above polymers is presented in Table S1 below.

Table S1. Selected characterization data of the poly(styrene-co-vinylimidazole) copolymers

Name	Elemental Composition (%)					IR data	
	C	H	N	S	V*	ν(C=N)	ν(V=O)
p(ST-co-VIM)_3-1	88.87	8.24	3.62	-	-	1456	-
p(ST-co-VIM)_5-1	89.79	8.41	2.30	-	-	1455	-
p(ST-co-VIM)_7-1	90.19	8.75	1.68	-	-	1456	-
p(ST-co-VIM)_3-1-V	70.99	7.16	2.74	1.54	3.8	1453	978
p(ST-co-VIM)_5-1-V	75.69	7.57	1.88	0.88	3.5	1453	980
p(ST-co-VIM)_7-1-V	79.35	7.70	1.28	0.67	2.8	1452	978

*Determined by ICP-OES

Table S2. AFM data for the microspheres

Sample Name	Size (μm)	Mean Roughness (Ra/nm)	Mean Height (nm)
p(VIM-co-EGDMA)	2 x 2	41.64	358.4
p(VIM-co-EGDMA)	1 x 1	8.29	30.50
p(VIM-co-EGDMA)-VO	2 x 2	21.01	116.4
p(VIM-co-EGDMA)-VO	1 x 1	13.35	74.87
p(VIM-co-EGDMA)-VO*	2 x 2	24.05	99.78
p(VIM-co-EGDMA)-VO*	1 x 1	25.57	63.14

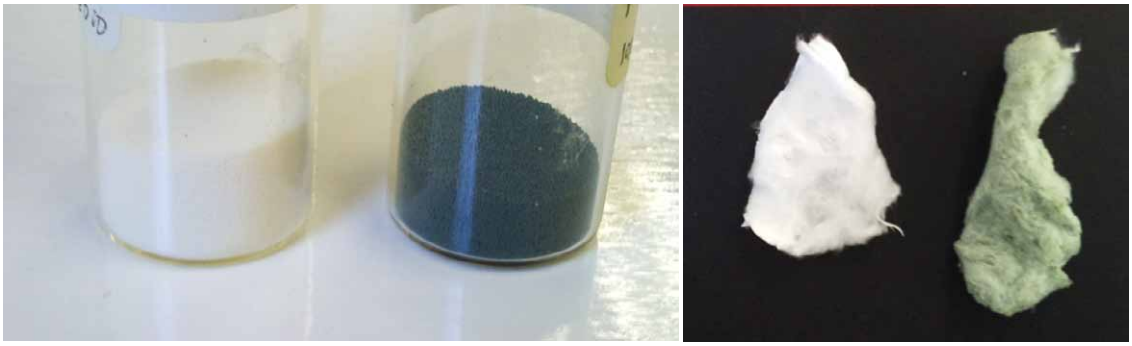

Figure S1. From left to right. Digital images of p(VIM-co-EGDMA), p(VIM-co-EGDMA)-VO, p(ST-co-VIM) and p(ST-co-VIM)-VO

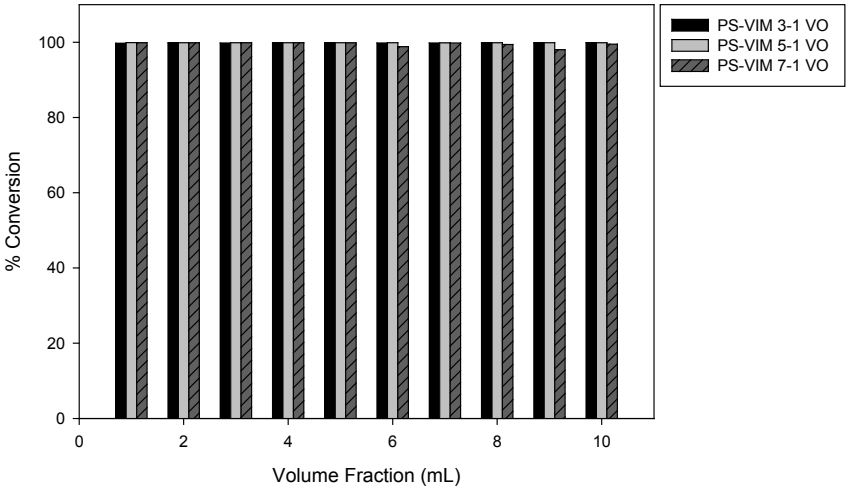

Figure S2. Effect of styrene/vinylimidazole ratio on overall catalytic conversion. Conditions: 0.025g of catalyst; 2 eq H_2O_2; 1 mmol thioanisole; ν = 2 mL/hr.

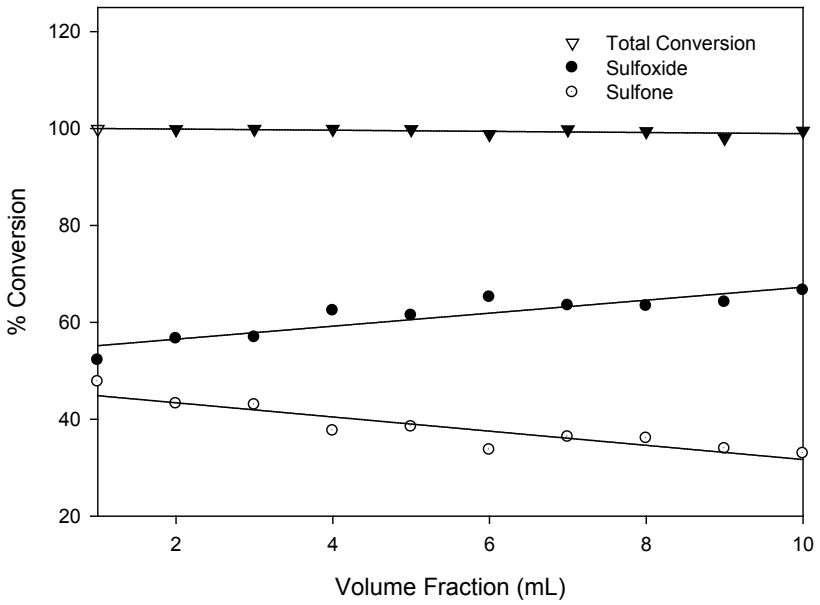

Figure S3. Selectivity using continuous flow. Conditions: 0.025g of p(ST-co-VIM)_7-1-VO; 2 eq H_2O_2; 1 mmol thioanisole; ν = 2 mL/hr.