

# Hybrid Sol-Gel Double Metal Cyanide Catalysts for the Copolymerisation of Styrene oxide and CO<sub>2</sub>

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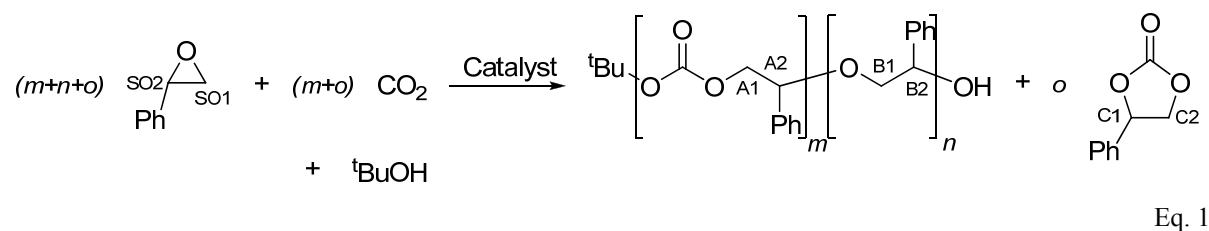
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## Supplementary data

For evaluating the efficiency of the catalysts in polymerisation (Eq. 1), <sup>1</sup>H NMR spectra were recorded of the crude reaction mixtures in CDCl<sub>3</sub>. The signals were assigned as listed in Table 1. The relative intensity of the signals was obtained by integration, whereby the intensity of the phenyl signals was set to five.



**Table 1:** Assignment of the signals in the  $^1\text{H}$  NMR spectra obtained for the reaction mixtures of the copolymerisation of styrene oxide and  $\text{CO}_2$

Assignment	Proton	Chemical shift [ppm]	Number of protons
Styrene carbonate	C1	4.80 and 4.28	2
	C2	5.68	1
Polycarbonate	A1	4.99	2
	A2	5.77	1
Polyether	B1	3.80	2
	B2	4.26	1
Phenyl groups	Ph	7.25-7.34	5
Styrene oxide	SO1	2.81 and 3.15	2
	SO2	3.87	1

**Table 2:** Statistical analysis of particle sizes in representative samples

No. of TEM image	Sample	Type A <sup>2</sup>		Type B	Type C
		Diameter	Thickness	Diameter	Diameter
		[nm] or [nm×nm]	[nm]	[nm×nm]	[nm×nm]
1	S1			198×208 196×242	
2	S1			130×183 76×77 133×136	
3	S1	105 84	13 9		
4	S1			194×215 128×159	
5	S1			168×197 223×243 61×74	
6	S1	160 301 276	21 13 22 20 19		
7	S1			120×120 219×169 222×167 119×125 188×188 161×182	
8	S1	154 151	10 10	383×471 243×286 296×327	
9	S1			199×304 138×143	
10	S1			234×234	
11	S1			182×159	
12	S1	274 442	13 10		
13	S1			312×346	
14	S1			426×548	
15	S2			210×215 353×403	
16	S2				220×104 88×31
17	S2				1830×1540
18	S2	123×105 111×113			
19	S2				247×408
20	S2			303×444 510×771	
21	S2			660×595	
22	S2		20 10	255×323 311×362 700×745	

				250×300	
23	S2				1140×1230
24	S2			897×926 397×396	
25	S2	270 700 140 230 220	20 15 20 20	484×630 268×295 232×284 462×533 644×784	
26	S2				1140×1830
27	S2				6850×9780
28	S5				121×58
29	S5				2620×1320
30	S5				1190×865
31	S5	182×78 135	15		
32	S5				536×274
33	S5	189×277 77×161 154×135 69×42			
34	S5	183×184 302×135			
35	S5		89 78 39 32 56 39		
36	S5		15 15		
37	S5	460 266 345 143 119	30 10 10		
38	S5				746×465
39	S5				5210×2870
40	S5		21 21		
41	S5	390 564			
42	S5				668×452
43	S5				1660×1470
44	S5	133			
45	S5				4430×2980

<sup>2</sup> Platelets selected for the statistical analysis were oriented either perpendicular or parallel to the viewing plane, so that either the horizontal extent (diameter) or the thickness of the particle were observed, respectively.