

Table S1: Detailed information on XRD result shown in Fig. 3

2-theta (deg)	d (ang.)	Phase name	Chemical formula	DB card number	Rel. int. I (a.u.)	Rel. height (a.u.)
43.280(5)	2.4272(2)	Periclase, syn (1,1,1)	MgO	00-004-0829	8.23	8.46
50.4000(12)	2.10226(5)	Periclase, syn (2,0,0)	MgO	00-004-0829	100	100
73.980(2)	1.48768(3)	Periclase, syn (2,2,0)	MgO	00-004-0829	51.32	43.68

- Measured pattern was compared to PDF-2 database issued by International Centre for Diffraction Data (ICDD, USA). Sample corresponds to magnesium oxide, PDF-2 card No. 00-004-0829-

- The peaks at positions 45.3 (2-theta) and 66.0 (2-theta) corresponds to K-beta line of MgO diffraction (200) and (220) respectively. Diffractometer is equipped with K-beta filter only.

Table S2: Names and structures of compounds shown in in Fig. 4 (Top)

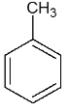
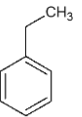
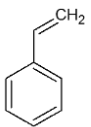
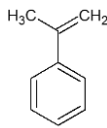
Name	Structure
Toluene	
Ethylbenzene	
Styrene	
Alpha-methylstyrene	

Table S3: Names and structures of compounds shown in in Fig. 4 (Bottom)

Name	Structure
Benzene, 1,1'-(1,3-propanediyl) bis-	
Benzene, 1,1'-(3-methyl-1-propene-1,3-diyl) bis-	
2-Methyl-1,1-diphenylpropene	
Benzene, 1,1'-(1-butene-1,4-diyl) bis-, (Z)-	
1-(4-Methylphenyl) -4-phenylbuta-1,3-diene	
1-Propene, 3-(2-cyclopentenyl)-2-methyl-1,1-diphenyl-	
1,3,5-Triphenylbenzene	
1,3,5-Triphenylcyclohexane	

Table S4: Effect of catalyst arrangement on the composition of oligomers produced

Temperature (°C)	Experiment	Total oligomers (wt.%)	Dimers (wt.%)	Trimers (wt.%)
400	Layered@Batch	8.3	6.5	1.8
	Mixed@Batch	6.7	3.3	3.4
	Layered@Semi-batch	26.3	11.5	14.8
	Mixed@Semi-batch	34.9	13.7	21.2
500	Layered@Batch	23.5	19.4	4.1
	Mixed@Batch	21.7	20.4	1.3
	Layered@Semi-batch	29.3	18.6	10.7
	Mixed@Semi-batch	32.3	18.7	13.6

wt. %: based on PS load

Table S5: Effect of carrier gas flowrate on the composition of oligomers produced

Nitrogen flowrate	Total oligomers	Dimers	Trimers
(ml/min)	(wt.%)	(wt.%)	(wt.%)
0 (Batch)	4.0	3.4	0.6
20	28.7	13.8	14.9
50	26.3	11.5	14.8
80	34.4	16.8	17.6
180	31.8	15.1	16.7

wt. %: based on PS load

Table S6: Effect of feed to catalyst ratio on the composition of oligomers produced

Catalyst to feed	Total oligomers	Dimers	Trimers
ratio (-)	(wt. %)	(wt.%)	(wt. %)
5	34.2	23.5	10.7
10	26.3	11.5	14.8
15	30.9	15.9	15.0
No Catalyst	32.4	9.5	22.9

wt. %: based on PS load