Supporting Information for

## Calcium stearate as acid scavenger for synthesizing bromobutyl rubber at high concentration in a Microreactor system

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## 1. Repeatability of 1H-NMR spectra

In this work, most of the quantitative analysis is based on the <sup>1</sup>H-NMR spectra. To ensure the accuracy of this measurement, each sample has been detected five times. Here, we randomly select five samples as evidence to evaluate the repeatability of <sup>1</sup>H-NMR spectra. The measurement error could be shown in the following Table S1. Three parameters of the sample,  $X_{trans}$ ,  $Y_{BIIR-1}$  and w, are used for the evaluation. The results can be seen in Table S1. Obviously, this method has a good repeatability and the standard difference of these three parameters are all less than 1.5%. Then the results we get from this method is relatively accurate.

No.	Repetition	X <sub>trans</sub> (%)	μ <sub>trans</sub> (%)	SD <sub>trans</sub> (%)	Y <sub>BIIR-1</sub> (%)	μ <sub>BIIR-1</sub> (%)	SD <sub>BIIR-1</sub> (%)	w (%)	μ <sub>w</sub> (%)	SD <sub>w</sub> (%)
	1	76.89			38.05			68.32		
	2	76.29			36.65	36.98	1.01	66.46	67.86	
1	3	75.30	76.26	0.78	37.99			68.98		1.36
	4	75.67			36.50			69.17		
	5	77.15			35.71			66.37		
	1	30.96			24.35			87.16	86.57	0.79
	2	32.06		0.47	25.03	24.65		85.98		
2	3	32.08	31.78		24.10		0.47	87.63		
	4	31.87			24.56			86.28		
	5	31.92			25.23			85.81		
3	1	42.45			29.80			78.30		
	2	42.48		0.48	31.73			79.93		1.36
	3	42.98	42.94		33.43	31.65	1.32	76.24	78.01	
	4	43.56			32.05			78.22		

Table S1. The measurement error of 1H-NMR spectra\*

	5	43.21			31.22			77.36		
	1	48.39	48.71	0.80	36.56			95.86	96.33	0.72
	2	49.84			38.12			97.46		
4	3	48.13			37.35	37.23	0.59	96.58		
	4	47.96			36.89			96.12		
	5	49.22			37.22			95.64		
	1	53.02	53.56		37.80			95.44		
	2	53.88		0.86	39.02	38.86		95.37 0.72 95.87		
5	3	52.37			39.69		0.72		96.00	0.67
	4	54.52			38.56			96.97		
	5	54.01			39.22			96.34		

\* $X_{trans}$ ,  $\mu_{trans}$  and  $SD_{trans}$  stand for the transformation of IIR, its mean value and standard deviation;  $Y_{BIIR-1}$ ,  $\mu_{BIIR-1}$  and  $SD_{BIIR-1}$  represent the yield of BIIR-1, its mean value and standard deviation; w,  $\mu_w$  and  $SD_w$  are the molar ratio of BIIR-1 in BIIR-1 and BIIR-2, its mean value and standard deviation.

## 2. Viscosities of different concentration IIR solutions

To figure out the variation of IIR viscosity with its concentration, eight different concentrations IIR solutions from 4.89 wt% to 24.31 wt% were prepared firstly. Considering it is a non-Newtonian polymer solution, a kind of coaxial cylinder rheometer (Anton Paar, MCR301) was used herein to detect the viscosity of IIR solution and the shear rate varied from 0.1 m/s to 1 m/s. While the shear rate of IIR solution in our system mainly focuses on 0.5 m/s, the corresponding viscosity has been shown in Table S1.

<i>T</i> (°C)	25	25	25	25	25	25	25	25
$v_{S}$ (m/s)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

Table S2. Viscosity of different IIR solution\*

$x_{IIR}$ (wt%)	4.88	6.75	9.45	14.77	15.25	18.46	21.51	24.31
$\mu$ (mPa·s)	4.59	9.68	35.1	181	297	711	1690	4340

\* $v_S$  is the shear rate of coaxial cylinder rheometer;  $x_{IIR}$  stands for the mass concentration of IIR;  $\mu$  represents the detected viscosity of IIR solution.

Table S2 declares that  $\mu$  varies with concentration of IIR. Especially, when  $x_{IIR}$  is less than 9.45 wt%, growth of  $\mu$  is relatively slow and  $\mu$  is always less 50 mPa·s. However, if  $x_{IIR}$  is larger than 9.45 wt%,  $\mu$  increases rapidly, even larger than 200 mPa·s at 15.25 wt%. Thus, compared with our previous 10 wt% IIR solution, 15 wt% IIR solution used in this work has a rather high viscosity.

## 3. Selectivity of BIIR-1 (w) from different companies

Detailed data of different BIIR from different companies, for instance, ExxonMobil, Lanxess and Cenway New Materials Co. Ltd. are provided in the following Table S3.

Туре	Exxon	Exxon	Lanxess	Lanxess	Cenway	Cenway	Cenway	Cenway
	2222	2223	2030	2031	2302	2303	2309	2310
w (%)	92.07	92.61	95.15	91.30	93.94	94.21	89.94	93.72

**Table S3.** Selectivity of BIIR-1 (w) from different companies