

# **Reinforcement of Styrene Butadiene Rubber Employing Poly(isobornyl methacrylate) (PIBOMA) as High $T_g$ Thermoplastic Polymer**

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**Table S1.** Free radical polymerization of IBOMA (reaction conditions: [AIBN] = 1.0 wt%, duration: 6h, [IBOMA] = 50 wt%).

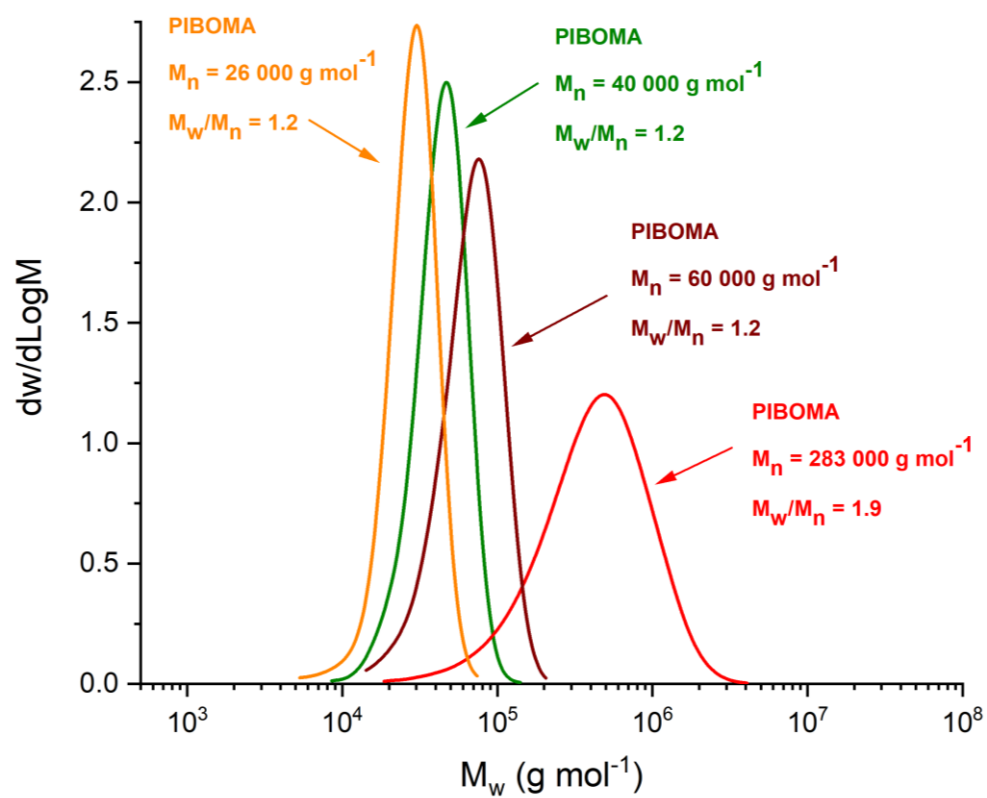
Entry	Solvent	Initiator	T [°C]	M <sub>n</sub> (g mol <sup>-1</sup> ) <sup>a</sup>	M <sub>w</sub> /M <sub>n</sub> <sup>a</sup>	Yield [%]
<b>1<sup>b</sup></b>	DMF	AIBN	60	715800 <sup>c</sup>	1.6	29
				59250	2.2	
<b>2</b>	Toluene	AIBN	60	73600	2.4	44
<b>3</b>	THF	AIBN	60	59500	2.2	74
<b>4</b>	Cyclohexane	AIBN	60	151800	2.3	41
<b>5</b>	1,1,2-TCA	AIBN	60	68400	2.7	71
<b>6</b>	1,1,2-TCA	ACHN	88	43600	2.4	77
<b>7<sup>d</sup></b>	1,1,2-TCA	ACVA	69	89000	2.1	75
<b>8</b>	1,1,2-TCA	VAm-110	110	82900	3.1	80
<b>9<sup>e</sup></b>	1,1,2-TCA	VAm-110	110	283000	1.9	70
<b>10</b>	Cyclohexane	ACHN	88	74300	2.6	49

<sup>a</sup>Molecular weight and M<sub>w</sub>/M<sub>n</sub> determined by GPC in THF at 40°C with calibration by PMMA standards. <sup>b</sup>The precipitation of PIBOMA was observed. <sup>c</sup>Bimodal distribution. <sup>d</sup>ACVA was found to be insoluble in 1,1,2-TCA. <sup>e</sup>Concentration of [AIBN] = 0.5 wt%.

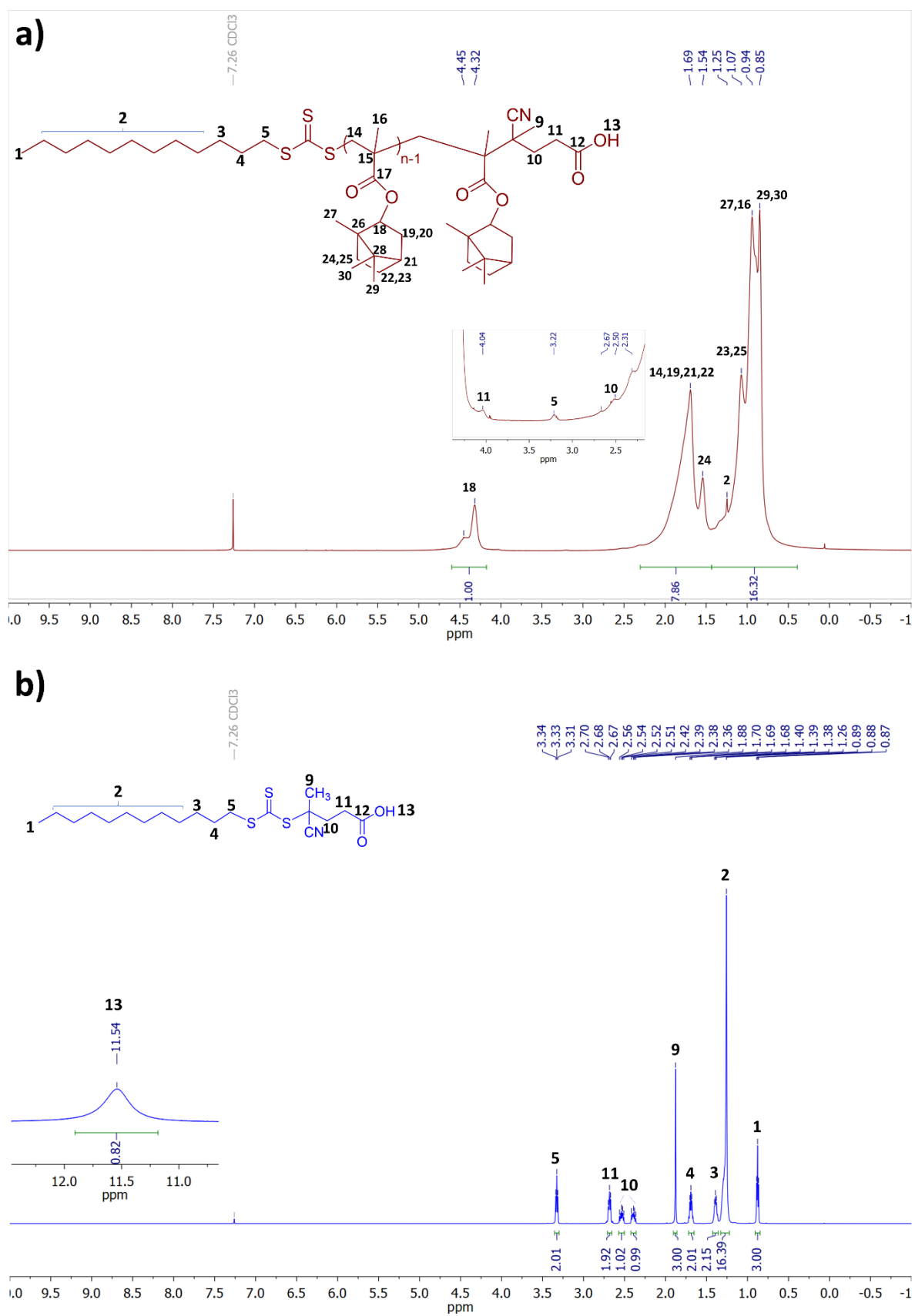
Solvents <sup>b</sup>													
Polymer	DCM	Chloroform	TCA	THF	DMF	DMAc	Cyclohexane	Toluene	NMP	Et <sub>2</sub> O	ACN	MeOH	Acetone
PIBOMA	+	+	+	+	+	+	+	+	-	+	-	-	-

**Table S2.** Solubility of PIBOMA<sup>a</sup>

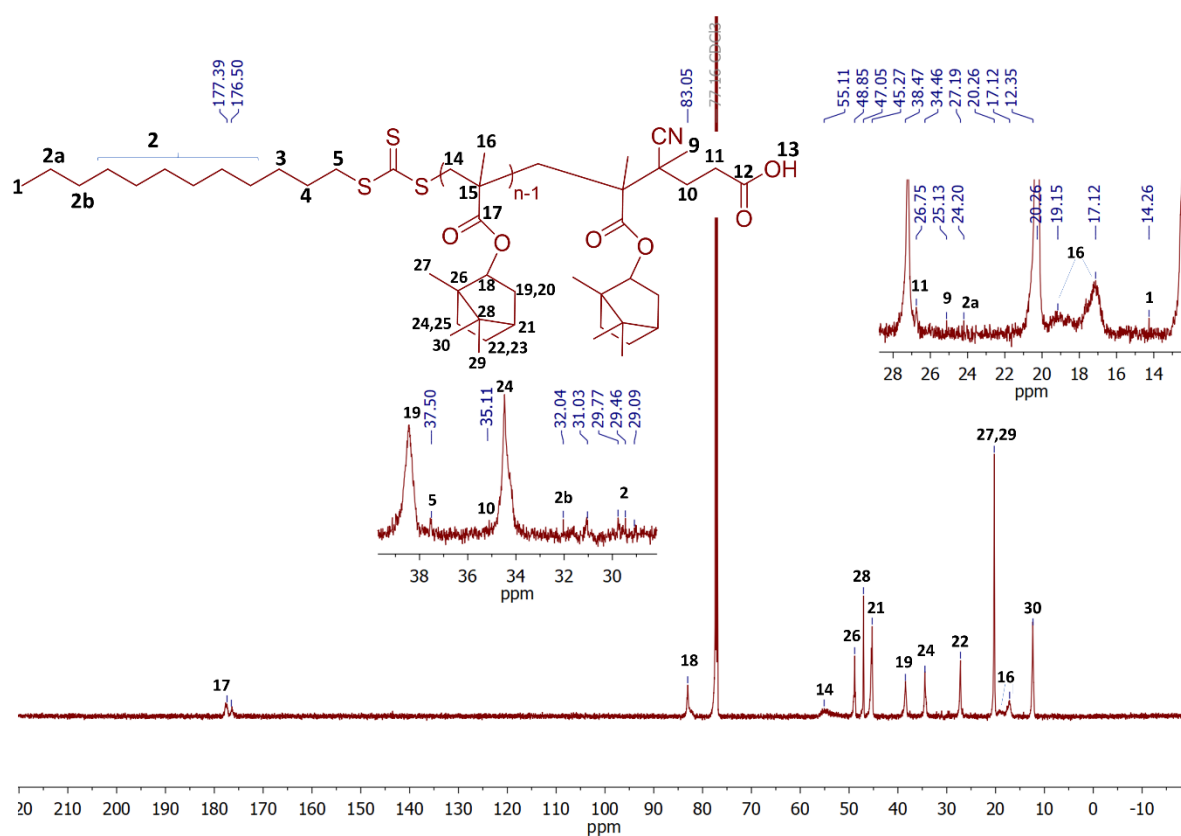
<sup>a</sup> Solubility: soluble at room temperature (+), soluble at 80°C (+<sup>t</sup>), insoluble even on heating (-). <sup>b</sup> DCM - dichloromethane; TCA - 1,1,1-trichloroethane; THF- tetrahydrofuran; DMF - N,N-dimethylformamide; DMSO - dimethyl sulfoxide; DMAc - N,N-dimethylacetamide; NMP - N-methyl-2-pyrrolidone; Et<sub>2</sub>O - diethyl ether; ACN - acetonitrile; MeOH - methanol.



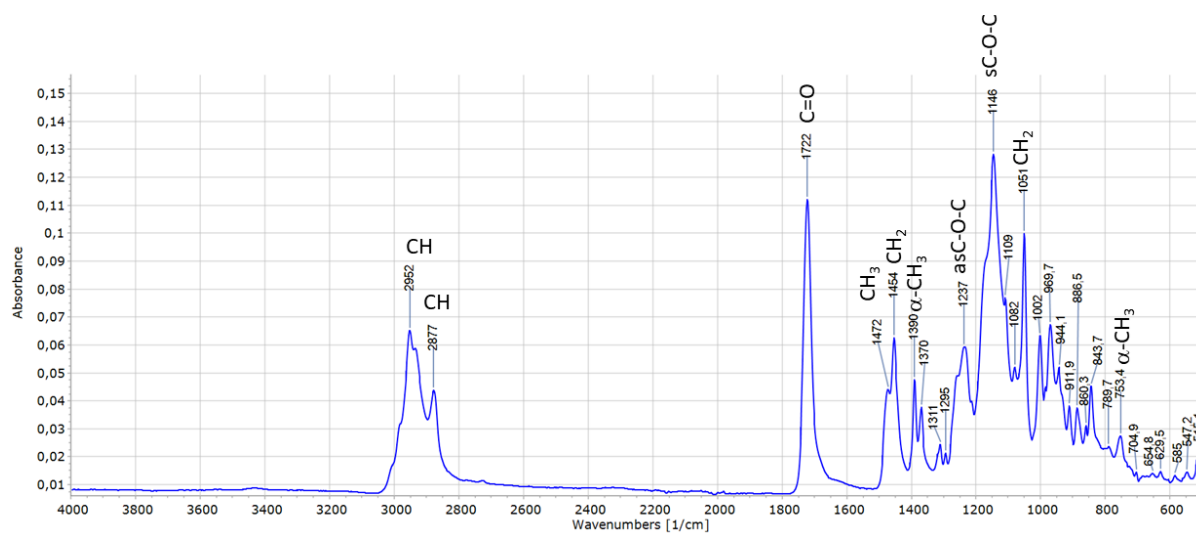
**Figure S1.** GPC traces of PIBOMA samples obtained via RAFT and free radical polymerization.



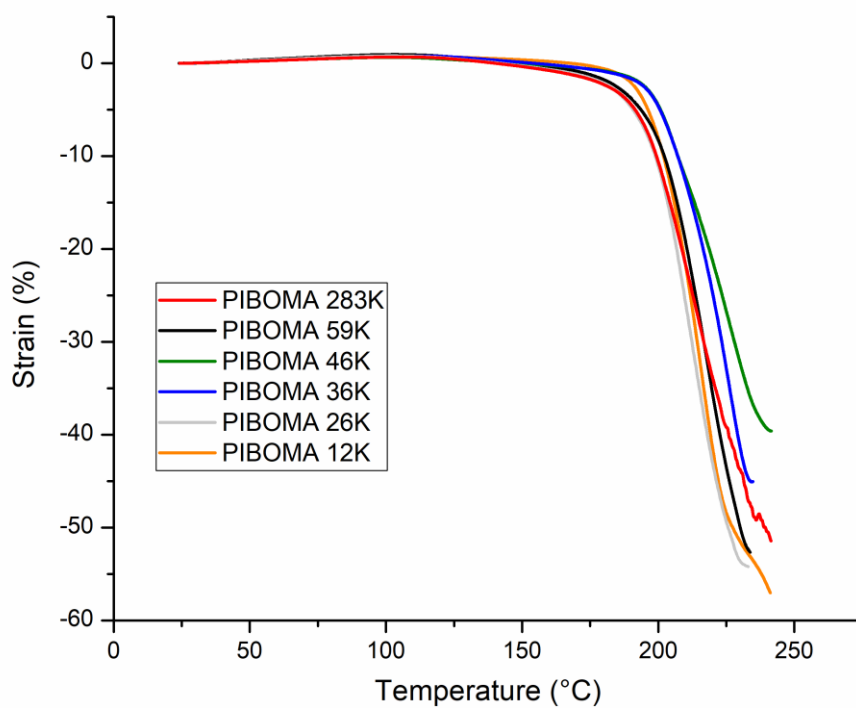
**Figure S2.**  $^1\text{H}$  NMR of PIBOMA 26K (a) and CDTPA RAFT agent (b) (25 °C,  $\text{CDCl}_3$ ).



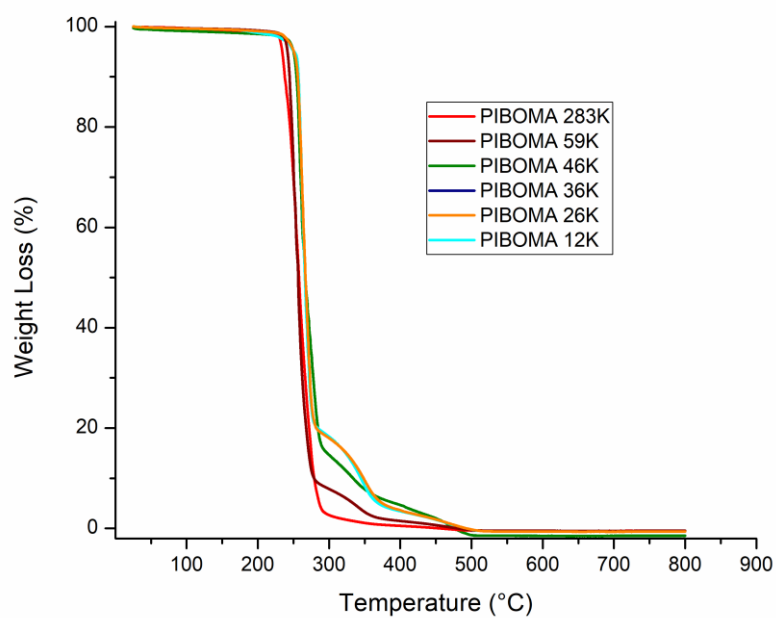
**Figure S3.**  $^{13}\text{C}$  NMR of PIBOMA 26K (25 °C,  $\text{CDCl}_3$ ).



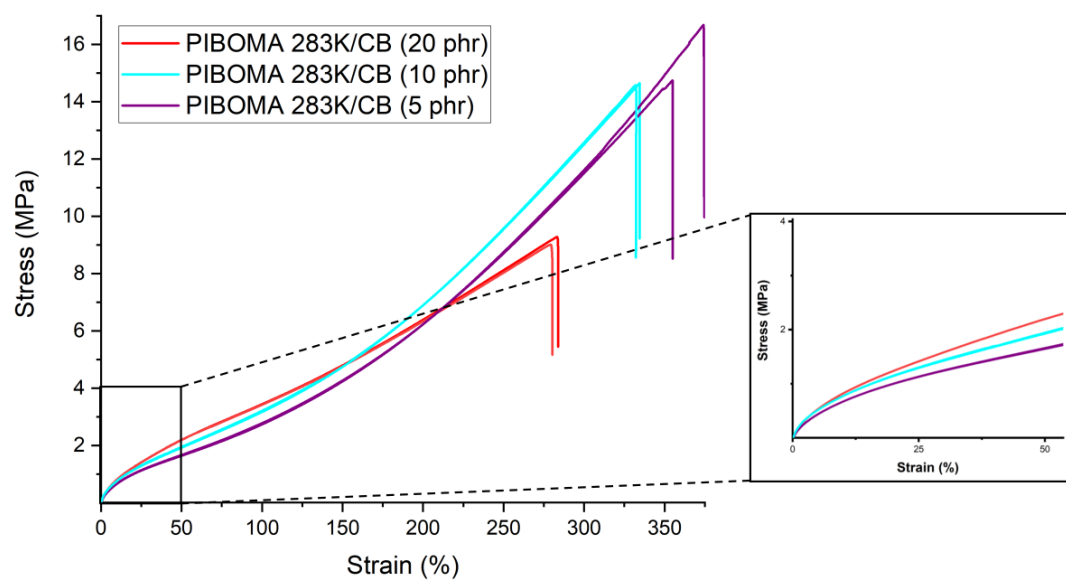
**Figure S4.** FT-IR spectrum of PIBOMA 26K.



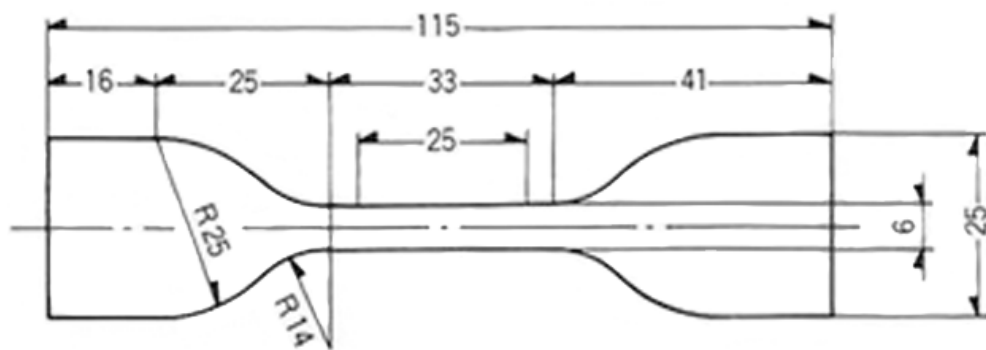
**Figure S5.** TMA traces of PIBOMA having different molar masses.



**Figure S6.** TGA traces of PIBOMA having different molar masses (TGA was performed in air with a heating rate of 5°C min<sup>-1</sup>).



**Figure S7.** Stress–strain curves of SBR compounds containing 50 phr of CB and filled with increasing content of PIBOMA283K.



**Figure S8.** Specimen dimensions used in tensile testing (correspond to Type V in ASTM D638-14).