

Synthesis of Acrylonitrile-Butadiene-Styrene Copolymers Through Interface-Initiated Room-Temperature Polymerization

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Supporting Information

S1. The appearance of the monoliths synthesized at 60 °C

Compared with the monoliths synthesized at low temperatures, the polymerization at 60 °C produced a monolith with porous structures. The voids are the result of the Trommsdorff effect in which the nitrogen gases produced by AIBN decomposition were trapped.

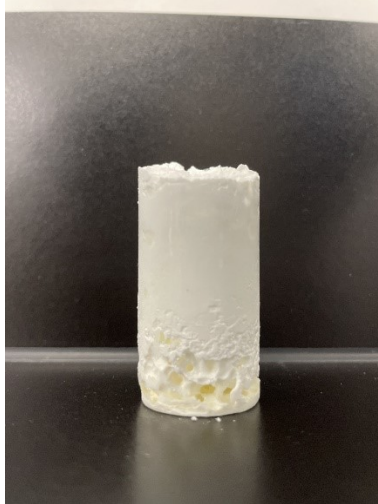


Figure S1. The appearance of the monolith synthesized at 60 °C.

S2. The FTIR spectrum of the ABS copolymers synthesized at different temperatures

The FTIR spectra of the ABS copolymers synthesized at 20, 40, and 60 °C are very similar. The assignment of the characteristic peaks is as follows: Aromatic out-of-plane C-H bending 699 and 756 cm^{-1} ; C-H bending of trans-1,4-butadiene 961 cm^{-1} ; C-N stretching 1000-1300 cm^{-1} ; C=C stretching from butadiene 1450 cm^{-1} ; aromatic stretching 1495 and 1598 cm^{-1} ; (-C \equiv N) stretching 2235 cm^{-1} ; asymmetric and symmetric -CH stretching 2850 and 2916 cm^{-1} ; aromatic C-H stretching 3077 cm^{-1} .

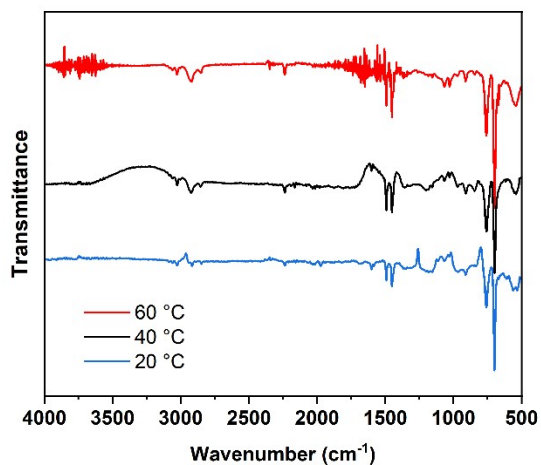


Figure S2. FTIR spectrum of the ABS copolymers synthesized at 20, 40, and 60 °C.

S3. The ^1H NMR spectrum of the ABS copolymers synthesized at different temperatures

The normalized ^1H NMR spectra of the ABS copolymers synthesized at 20, 40, and 60 °C are almost identical. The NMR spectra showed that the ABS copolymers synthesized at 20, 40, and 60 °C are almost identical in chemical compositions and structures.

The chemical compositions were determined using the area under each characteristic peak normalized by the number of the corresponding hydrogen atoms.¹ The signals for the aromatic ring of the styrene segment are located at 6.8-7.3 ppm. The signals for butadiene at 4.8-5.6 ppm are relatively weak as shown in the inset. The signals for the saturated backbone segments contributed by acrylonitrile, butadiene, and styrene are significantly overlapped in the range of 1-3 ppm. In this range, the signal contributed from the acrylonitrile units was calculated by subtracting that for styrene and butadiene.

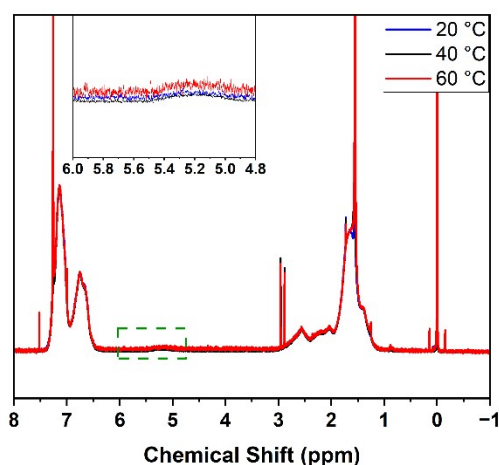


Figure S3. ^1H NMR spectrum of the ABS copolymers synthesized at 20, 40, and 60 °C.

(1) Kim, S.; Yu, H. Y.; Jeong, C. H.; Choi, E.; Ahn, S. Composition analysis of grafted ABS and its blend copolymers using a combination of ^1H NMR spectroscopy and nitrogen element analysis. *Bull. Korean Chem. Soc.* **2021**, *42*, 1251