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Pressure Effect of Various Inert Gases on the Phase Behavior of Polystyrene-*block*-Poly(*n*-pentyl methacrylate) Copolymer HONG CHUL MOON, HYE JEONG KIM, Pohang University of Science and Technology, JUNHAN CHO, Dankook University, JIN KON KIM, Pohang University of Science and Technology — We investigated the pressure effect of three inert gases (nitrogen, helium and argon) on the phase behavior of polystyrene-*block*-poly(*n*-pentylmethacrylate) copolymer (PS-*b*-PnPMA) showing closed-loop phase behavior and baroplasticity. Helium gas pressure enhanced the miscibility between PS and PnPMA blocks similar to the hydrostatic pressure. Very interestingly, however, with increasing nitrogen and argon gas pressure, the miscibility between the two blocks decreased even though these two are also considered as inert gases. To explain these unexpected results, we measured the amount of gas absorption into each block. The experimentally measured gas absorption results are consistent with the theoretical ones based on the Sanchez-Lacombe theory. The results in this study imply that well-known and widely employed inert gases such as nitrogen and argon could significantly affect the phase behavior of a weakly interacting block copolymer at high pressures.

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