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Scaling of Domain Spacing of Block Copolymers Dilated by High-Pressure Carbon Dioxide TIMOTHY FRANCIS, BRYAN VOGT, XIAOHUI WANG, JAMES WATKINS, DEPARTMENT OF CHEMICAL ENGINEERING, UNIVERSITY OF MASSACHUSETTS COLLABORATION, POLYMERS DIVISION, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY COLLABORATION, POLYMER SCIENCE AND ENGINEERING DEPARTMENT, UNIVERSITY OF MASSACHUSETTS COLLABORATION — The dependence of the interdomain spacing on the sorbed solvent volume fraction of microphase separated poly(styrene-*b*-dimethyl siloxane) in the high concentration limit was probed using high-pressure carbon dioxide as the diluent. Domain spacing was measured using *in situ* small angle neutron scattering, both isothermally and at constant polymer volume fraction. The results indicate that high-pressure CO_2 behaves similarly to a selective liquid solvent and that d-spacing is strongly influenced by solvent selectivity, which is a function of temperature for this system. The data also show that the d-spacing as a function of solvent volume fraction cannot be described by the traditional power law scaling that does not account for solvent selectivity, but collapse to a line when scaled by a swelling asymmetry factor. Data measured at constant polymer volume fraction are in good agreement with previously reported findings, and show that the interdomain spacing exhibits power law scaling with the temperature dependent interaction parameter.

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