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Nanoporous Materials Formed in Condensed Carbon Dioxide
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We propose a strategy utilizing condensed carbon dioxide as a selective–solvent for creating nanoporous materials from block copolymer templates. Cylinder–forming polystyrene–*b*–polylactide ($f_{PLA} = 0.37$) monoliths were annealed in carbon dioxide at constant temperature and various solvent densities. The swollen structures were then quenched at low temperature isochorically. Small-angle X-ray scattering measurements indicated the domain spacing increased with increasing CO_2 density. This result is consistent with the formation of cylindrical pores within the intact polylactide domains, a conclusion confirmed by scanning electron micrographs of the processed monoliths. This controlled, non-destructive technique allows for creating tunable pore structures from a single block copolymer.

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