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Electron tomography of a novel non-cubic network phase in ABC copolymers GERD E. SCHROEDER, STEPHEN T. HYDE, Applied Maths, RSPhysSE, Australian National University, 0200 ACT, Australia, HERMIS IATROU, NIKOS HADJICHRISTIDIS, Chemistry Dept, Univ of Athens, Panepistimiopolis, Zografou 15771, Athens, Greece, SATOSHI AKASAKA, HIROKAZU HASEGAWA, Dept of Polymer Chemistry, Grad School of Engineering, Kyoto Univ, Katsura, Nishikyo-ku, Kyoto 615-8510, Japan — We report the discovery of a novel bicontinuous tetragonal phase in the linear ABC triblock terpolymer system polystyrene (PS), polyisoprene (PI) and polydimethylsilocane (PDMS). The data is consistent with spacegroup Fddd and is distinctly non-cubic. The channel topology is distinct from the better-known cubic bicontinuous mesophases (diamond and gyroid types, with channels). It consists in 2 identical intertwined labyrinths with 3- and 4-connected nodes. Our mesophase differs from an earlier report of a copolymer phase (also in a linear terpolymer system) with the same spacegroup by Epps *et al* (Macromolecules **37**, 8325-41, 2004), who deduced a single channel morphology, based on TEM and SAXS data. Our proposal is based on 3D e^--tomography data. The channel geometry is identified via a medial surface (MS) algorithm. For a labyrinth, the MS is a generalised channel graph consisting in surface patches. In contrast to line graphs, the MS is a complete descriptor of both topology and geometry. It provides robust shape characteristics, and is a useful tool for visualisation of complicated hyperbolic mazes.

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