Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

The Fddd Network Phase in Triblock and Diblock Copolymer Melts CHRISTOPHER TYLER, DAVID MORSE, University of Minnesota — The phase behavior of ABC triblock and AB diblock copolymer melts has been investigated by self-consistent field theory (SCFT), while allowing for (among other candidates) the orthorhombic Fddd (O^{70}) network phase identified in recent experiments with poly(isoprene-b-styrene-b-ethylene oxide) (ISO) triblocks. Predicted phase diagrams for triblocks with interaction parameters similar to those of ISO contain an O^{70} phase bordered by gyroid, lamellar, and alternating gyroid phases, in agreement with experiment. The O^{70} network is also found to be stable in diblock melts within a narrow region that overlaps the weak segregation end of the gyroid region found in previous calculations. A previous hint of the existence of an unidentified phase in this part of the diblock phase diagram was given in the work of A.-C. Shi and coworkers, who found the gyroid phase to be locally unstable with respect to composition fluctuations in the region of parameter space in which we find the O^{70} network to be preferred over the gyroid.

David Morse
University of Minnesota

Date submitted: 05 Dec 2004 Electronic form version 1.4