# Stability of the Frank-Kasper Phases in Conformationally Asymmetric Block Copolymers

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The quasicrystal phases which were typically observed in metal alloys have emerged with block copolymers (BCPs) self-assembly providing a new potential in soft materials. Theoretical and experimental studies have revealed that the conformational asymmetry (ε) of different blocks provides the main mechanism for stabilizing the Frank-Kasper (FK) phases in block copolymers (BCPs) self-assembly. In this study, we designed a high conformationally asymmetric polydimethylsiloxane-b-poly(2,2,2-triflouroethyl acrylate)s (PDMS-b-PTFEAs) with flexible silicon-containing blocks and rigid fluorine-containing blocks. The value of ε was calculated to be 2.20, higher than other BCPs reported in the literature. As a result, using small-angle X-ray scattering, the FK σ and C14 phases were observed at $f_{PDMS}$ = 0.80 and 0.85, respectively. Based on the fact that the stability of σ phase increases by the value of ε, we speculate that the stability level of the C14 phase as well as σ phase is due to the relatively high ε of PDMS-b-PTFEAs.