

Abstract Submitted
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Quasicrystalline long-range order in an ABC star block copolymer TOMONARI DOTERA, Department of Polymer Chemistry, Kyoto University, Japan — We report the formation of a dodecagonal quasicrystal (DDQC) in a lattice Monte Carlo simulation of a star-shaped three component polymeric alloy. We have observed a series of Archimedean and quasicrystalline phases $(4.8^2) \rightarrow (3^2.4.3.4) \rightarrow \text{DDQC} \rightarrow (4.6.12)$ with increase of one component of ABC star polymers. This phase behavior can be regarded as a transition from square tiling to triangle tiling via square-triangle tiling. The simulation is associated with the recent striking experimental manifestation of quasicrystalline order: A mesoscopic tiling pattern with twelvefold symmetry in a three-component star polymer system composed of polyisoprene, polystyrene, and poly (2-vinylpyridine). Since, the same kind of quasicrystalline structures have been found for metal alloys, chalcogenides, and liquid crystals, the present result confirms the universal nature of quasicrystalline long-range order over several hierarchical length scales.

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