**[Dictating particle packing symmetry in diblock/core-homopolymer blends with homopolymer length](https://acs.digitellinc.com/acs/live/22/page/677/4?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201" \l "sessionCollapse394021)**

[*Andreas Mueller*](https://acs.digitellinc.com/acs/live/22/page/677/4?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201)*,* [*Aaron Lindsay*](https://acs.digitellinc.com/acs/live/22/page/677/4?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201)*,*[*Steven Weigand*](https://acs.digitellinc.com/acs/live/22/page/677/4?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201)*,*[*Timothy Lodge*](https://acs.digitellinc.com/acs/live/22/page/677/4?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201)*,*[*Dr. Mahesh Mahanthappa*](https://acs.digitellinc.com/acs/live/22/page/677/4?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201)*, and* [*Frank Bates*](https://acs.digitellinc.com/acs/live/22/page/677/4?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201)

*University of Minnesota Twin Cities*

Recently, various block copolymer blending strategies have demonstrated that Frank-Kasper (FK) phases represent equilibrium states in particle forming block copolymers (BCP). Close examinations of the symmetry selection between this diverse set of energetically near-degenerate particle packings provides an unrivaled look into the nuances of BCP self-assembly. Building on our recent report of the ability of core-homopolymer/diblock blends to generate FK phases, we sought to investigate the impact of homopolymer molecular weight on the symmetry of the resultant particle packings. We blended a FK-phase forming poly (ethylene oxide-*block*-2-ethyl hexyl acrylate) (PEO-P(2-EHA)) diblock with poly (ethylene oxide) (PEO) homopolymers across a range of molecular weights. Temperature dependent synchrotron small angle X-ray scattering indicated a strong dependence of particle packing symmetry on homopolymer molecular weight. Namely, FK phases with lower volume asymmetry between constituent particles such as sigma was favored for blends with lower molecular weight homopolymers whereas high volume asymmetry phases such as the Laves C14 and C15 lattices were favored for blends with higher molecular weight homopolymers. These results may be rationalized in terms of the homopolymer distribution within each of these particle packings, demonstrating that homopolymers are a tool in the formation of FK phases and offer control over which particle packing arises.

A picture containing diagram

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