

Title: Quantitative description of the self-assembly of patchy particles into chains and rings

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Abstract: We numerically study a simple fluid composed of particles having a hard-core repulsion complemented by two patchy attractive sites on the particle poles. An appropriate choice of the patch angular width allows for the formation of ring structures which, at low temperatures and low densities, compete with the growth of linear aggregates. The simplicity of the model makes it possible to compare simulation results and theoretical predictions based on the Wertheim perturbation theory, specialized to the case in which ring formation is allowed. Such a comparison offers a unique framework for establishing the quality of the analytic predictions. We find that the Wertheim theory describes remarkably well the simulation results. (C) 2012 American Institute of Physics. [<http://dx.doi.org/10.1063/1.4737930>]

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