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Aggregation Transitions in Flexible Homopolymer Systems TOMAS KOCI, MICHAEL BACHMANN, Univ of Georgia, SOFT MATTER SYSTEMS RESEARCH GROUP TEAM — Ubiquitous in biological systems, aggregation transitions are the key towards understanding a multitude of topics such as the amyloid sheet formation and prionic disease. By means of extensive replica-exchange Monte Carlo simulations of a generic coarse-grained model we examine systems consisting of up to 20 individual polymer chains. The application of powerful microcanonical analysis methods reveals new details about the anatomy of aggregation transitions that were previously inaccessible via conventional canonical analysis. We find evidence for phase separation in the transition region and classify the transition as first order. Finally we show that the aggregation transition consists of a hierarchy of sub-phase transitions and discuss the implications of this finding.

Tomas Koci
Univ of Georgia

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