Abstract Submitted
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Studying the formation of different phases of self-assembled cross-linked F-actin[1] LAM T. NGUYEN, MARTECH, Physics Dept., Florida State University, WEI YANG, Chemistry and Biochemistry Dept., Florida State University, LINDA S. HIRST, School of Natural Sciences, University of California, Merced — Self-assembly of the system of F-actin and different linking proteins is studied using complementary methods of confocal microscopy, small angle x-ray scattering (SAXS) and molecular dynamics (MD) simulations. Studies using alpha-actinin (as a cross-linker) show that, by varying the actin concentration (C_A) and α-actinin to actin molar ratio (γ) the assembled system might fall in one of three different phases: (1) loosely connected network of F-actin and bundles, (2) strongly connected and homogeneous network of bundles, and interestingly, (3) loosely connected and inhomogeneous network of dense domains – an intermediate phase between the first two. The phenomena can be explained statistical mechanically and replicated using our MD simulations. Further understanding based on simulations with different types of cross-linkers shows that the formation of different phases is related to the flexibility in binding between F-actin and cross-linkers, which leads to the possibility of forming branching points and thus bundle networks.

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