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The behavior of multivalent ions in binary polyelectrolyte mixtures OLENA ZRIBI, Department of Materials Science and Engineering, Department of Physics, Department of Bioengineering, University of Illinois at Urbana-Champaign, RAMIN GOLESTANIAN, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, Institute for Advanced Studies in Basic Sciences, Zanjan, Iran, TANNIE LIVERPOOL, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, HEE KYUNG, HYUNG S. LEE, GERARD C. L. WONG, Department of Materials Science and Engineering, Department of Physics, Department of Bioengineering, University of Illinois at Urbana-Champaign — Multivalent ions can induce condensation of like-charged polyelectrolytes into compact states, a process that requires different ion valence for different polyelectrolyte species. We investigate the condensation behavior of binary anionic polyelectrolyte mixtures consisting of DNA coils and F-actin rods in the presence of different multivalent ions (such as spermidine and tobramycin, a multivalent antibiotic). The mixture phase can separate into coexisting finite-sized F-actin bundles and DNA toroids. Further, by increasing the DNA volume fraction in the mixture, condensed F-actin bundles can be completely destabilized, leading to only DNA condensation within the mixture. We examine a number of possible causes and propose a model based on polyelectrolyte competition for ions.

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