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Order-Order Transition of Size-mismatched Ions on F-actin Polyelectrolytes ROBERT CORIDAN, Department of Physics, University of Illinois, Urbana-Champaign, LORI K. SANDERS, Department of Materials Science & Engineering, University of Illinois at Urbana-Champaign, WUJING XIAN, Department of Materials Science & Engineering, Department of Bioengineering, University of Illinois, Urbana-Champaign, BRIAN W. MATTHEWS, Institute of Molecular Biology, University of Oregon at Eugene, GERARD C. L. WONG, Department of Materials Science & Engineering, Department of Physics, Department of Bioengineering, University of Illinois at Urbana-Champaign — Multivalent ions induce condensation of like-charged F-actin polyelectrolytes into close-packed bundles, in which multivalent ions organize into 1-D density waves. We examine the condensation behavior of anionic F-actin using multivalent cations with a large size mismatch, Ba^{2+} and lysozyme(+9), a small globular protein (2.5nm x 2.5nm x 4.5nm). An unexpected first-order phase transition on the F-actin surface between a Ba^{2+} counterion charge density wave state and 1-D close-packed lysozyme chains is found as the lysozyme-actin ratio is varied. By comparing wild-type lysozyme with genetically-engineered lysozyme with reduced charge, we show that this transition shifts with the actin-lysozyme isoelectric point.

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