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Transition from monomeric phase to dynamic cluster phase in lysozyme protein solutions YUN LIU, University of Delaware/National Institute of Standards and Technology, PETER FALUS, LIONEL PORCAR, Institut Laue-Langevin, EMILIANO FRATINI, University of Florence, WEI-REN CHEN, Oak Ridge National Laboratory, ANTONIO FARAONE, University of Maryland/National Institute of Standards and Technology, KUNLUN HONG, Oak Ridge National Laboratory, PIERO BAGLIONI, University of Florence — Intermediate range order (IRO) has been recently observed in lysozyme solution that is caused by a combination of a short-range attraction and long-range repulsion. At very high concentration, there is observed cluster formation in lysozyme solutions that is one type of IRO structures. Here, we investigate the temperature effect on the dynamic cluster formation and identify the transition concentration from a monomeric protein phase to a cluster phase. The normalized short-time self-diffusion coefficient is not affected by changing attraction strength at the concentration of about 10% mass fraction, indicating that the system is still dominated by monomeric protein phase. However, at high concentrations, the average self-diffusion coefficient is sensitive to the change of short-range attraction strength, which is interpreted due to the growth of the size of dynamic clusters in solution. The transition concentration from dominating monomeric phase to dynamic cluster phase is estimated to be around 14 % mass fraction.

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