

Experimental Report

Influence of Cosolvents, Temperature, and Pressure on the Intermolecular Interaction and Phase-Separation of Concentrated Protein Solutions

The aim of the experiment was to investigate the influence of pressure p and temperature T on the intermolecular interaction and phase-separation of concentrated protein solutions. While the reentrant pressure-dependent liquid-liquid phase separation (LLPS) region in the presence of salt has been observed and reported for lysozyme concentrations c around 20 wt.% [1], even higher and lower concentrations were still missing. Based on data obtained during an ESRF beamtime at ID02, a temperature–pressure–concentration phase diagram for dense lysozyme solutions for concentrations between 6 and 30 wt. % (see fig. 1) has been published:

Julian Schulze, Johannes Möller, Jonathan Weine, Karin Julius, Nico König, Julia Nase, Michael Paulus, Metin Tolan and Roland Winter: *Phase behavior of lysozyme solutions in the liquid–liquid phase coexistence region at high hydrostatic pressures*. *Physical Chemistry Chemical Physics*, **18** (2016), 14252.

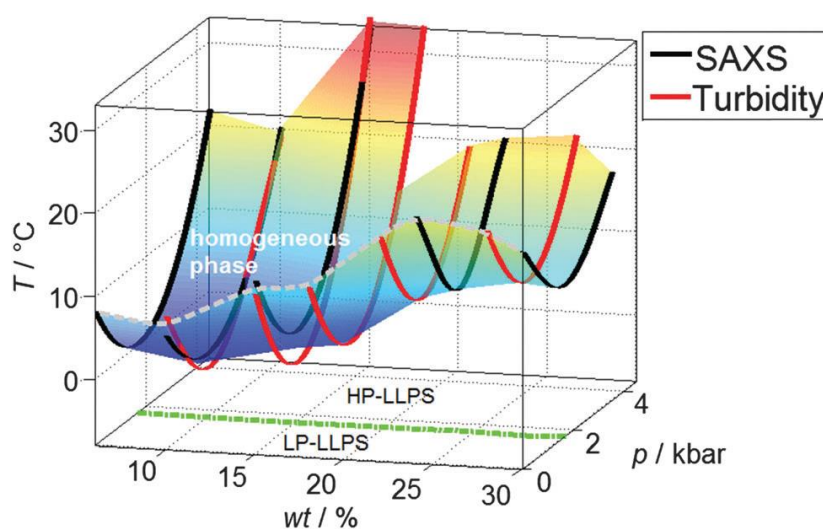


Fig 1: Temperature–pressure–protein concentration phase diagram of dense lysozyme solutions in the liquid–liquid phase separation (LLPS) region (the area below the colored homogeneous solution phase) obtained by SAXS and light transmission (turbidity) measurements. The dashed grey line denotes the results for ambient pressure conditions, the dashed-dotted green line at the bottom indicates the position of the minima of the phase boundaries (in p -direction) and separates the LP-LLPS from the HP-LLPS region.

[1] J. Möller, S. Grobelny, J. Schulze, A. Steffen, S. Bieder, M. Paulus, M. Tolan and R. Winter, *Phys. Rev. Lett.* 112 (2014) 028101.