

BeNano series light scattering in life sciences - Now with micro rheology and auto titration option

The complexity of biological macromolecules, like proteins, makes them interesting objects for biophysical characterisation during enrichment, engineering (recombinant proteins), process development (e. g. of biopharmaceuticals) and quality control. Optimised conditions are an important prerequisite to guarantee proteins' in vitro integrity, functionality and stability. Stress factors like temperature, buffer pH, salt content or ageing during storage can lead to alteration of biophysical characteristics due to protein denaturation (e.g. destruction of tertiary and/or quaternary structure or aggregation).

Instruments of the BETTERSIZE BeNano series particle analysers are a helpful tool in biomolecules' analysis. Dynamic light scattering (DLS), electrophoretic light scattering (ELS) and static light scattering (SLS) are used for particle size, zeta potential and molecular mass determination. Besides these general parameters, viscoelastic properties (e. g. complex viscosity), determined by the new BeNano microrheology option, can also be important in structural and functional analysis of biomolecules. In addition, equipped with the fully automated titrator BAT-1 (Fig. 1), the determination of the isoelectric point is also possible.



Figure 1: BeNano with auto titrator BAT-1

Light scattering methods provide insight in structural changes of macromolecules like proteins. For example, by analysing bovine serum albumin (BSA) under heat stress in H₂O, due to particle size increase, agglomeration and denaturation is obvious from 65°C (Fig. 2). This denaturation process leads to gelation and therefore increasing complex viscosity of the protein sample at high temperature (Fig. 2).

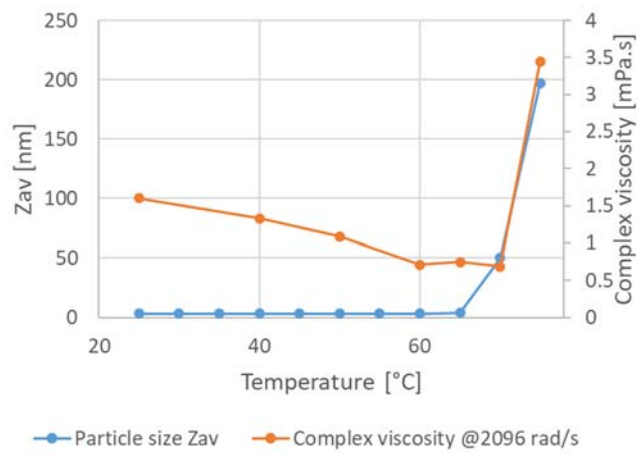


Figure 2: Heat denaturation of BSA (10 % in water) – BeNano light scattering for particle size and complex viscosity determination