

Light Scattering in the Eye Lens Near the Spinodal

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Scattered light intensities measurements of the nuclear part of adult bovine lenses are reported. In the investigated samples the existence of a binary liquid phase separation from a metastable state is demonstrated by the phenomenon of hysteresis. Fluctuations near spinodal are studied by means of a tentative theoretical approach. Accordingly the scattered light intensities were analyzed reduced by the intensity obtained for the stable state of the system. Fluctuations in the stable state are ascribed to protein aggregates and are analyzed by means of random density fluctuation theory. To evaluate the correlation length of the fluctuations near spinodal the Ornstein-Zernike theory is adopted. Temperature dependence of the correlation length ξ of the fluctuations near spinodal can be described by equation for critical

fluctuations $\xi = \xi_0 \left(\frac{T - T_s}{T_s} \right)^{-\nu}$. For the investigated lenses the exponent ν varies from 0.65 to 0.74 and the parameter ξ_0 varies from 1.6 nm to 3.6 nm. The spinodal temperature T_s for the investigated samples is evaluated.