STATIC LIGHT SCATTERING STUDIES OF THE MOLECULAR WEIGHT AND SECOND VIRIAL COEFFICIENT OF EYE LENS ALPHA CRYSTALLIN, AS FUNCTIONS OF pH AND IONIC STRENGTH. ***K. Segall****, P. Madden, M. Wallingford, E. Putzig, B. Haehnel, D. Carter*, G. Thurston*, kjs4482@rit.edu, GeorgeMThurston@gmail.com*

The electrostatic properties of eye lens proteins are important in determining their high concentration light scattering and phase separation, relevant to cataract disease. We are using static light scattering to measure the molecular weight and 2nd virial coefficient of the largest, most prevalent eye lens protein, alpha crystallin, as functions of pH and ionic strength, in order to investigate the consequences of varying both protein charge and charge screening in solution. Alpha crystallin is a large, somewhat polydisperse globular protein that comprises numerous subunits, each approximately 20,000 grams per mole (20kDa). Measurements of the intensity of the scattered light, at low protein concentrations, give direct information about the molecular weight and interactions of particles in solution. Upon varying the pH from 6 to 7.4 we find that alpha crystallin has an approximately stable molecular weight of around 750 kDa, varying about 100kDa from this average depending on pH. Changing the ionic strength had little effect on the molecular weight. The dimensionless second virial coefficients were found to be generally between 5 and 18, consistent with repulsive interactions. By comparison, a particle with hard-sphere repulsion only has a dimensionless virial coefficient of 4. In general, for alpha crystallin, we find in this pH range that lowering the ionic strength increased the second virial coefficients, corresponding to increasingly repulsive interprotein interactions.