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Dynamic Light Scattering Study of Carbon Nanoparticles Aggregating in Aerosol Phase RAJAN DHAUBHADEL, AMITABHA CHAKRABARTI, CHRISTOPHER M. SORENSEN, Kansas State University — Intensity correlation function was measured using ALV5000 correlator for the aerosol system created inside an optical chamber by exploding a mixture of a hydrocarbon (Acetylene) and oxygen. The observations were taken at two q (scattering wave vector) values $8.81 \mu\text{m}^{-1}$ and $24.20 \mu\text{m}^{-1}$, which for $\lambda = 488\text{nm}$ correspond to scattering angles 40° and 140° respectively. For a system with medium volume fractions ($\sim 8 \times 10^{-5}$) or higher it was observed that the decay in intensity correlation was exponential initially for up to about 1 minute and then transitioned to stretched exponential with stretched exponent of about 0.45 for $q = 24.20 \mu\text{m}^{-1}$ and 0.65 for $q = 8.81 \mu\text{m}^{-1}$. The value of intensity correlation function at small time is also found to decrease a little bit with time at both q . This indicates the development of static scatterer in the scattering volume with time (gelling of the cluster). This also introduced non-ergodicity in the system.

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