Optical Analyses of Heat and Mass Transfer Processes on Micronsized Aerosolparticles

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The technique of optical levitation of single particles by light pressure and the method of generation of a continuous chain of highly monodisperse particles in the size range from typically 10 to 20 µm is described. The evaporation of such microdroplets is investigated by elastic and inelastic light scattering. The phenomenon of optical resonances in microdroplets is briefly described. It is shown that these resonances can be used to determine the size of liquid particles in the micrometer size range with an accuracy unmatched by any other method (1). The inelastic light scattering process, the Raman scattering, is used to determine the concentration of the vapor phase in the neighborhood of evaporating particles. The method developed for this purpose allows the measurement of the vapor concentration with a space resolution in the order of one µm in the immediate neighborhood of the particles. Results of the optical determination of the temperature of freely moving microparticles will be presented and the method used briefly mentioned (2,3)

(1) G. Schweiger, *Raman scattering on microparticles: size dependence*, J Opt. Soc. Am. B **8** (1991) pp 1770 - 1778.

(2) R. Vehring, and G. Schweiger, *Optical determination of the temperature of transparent microparticles*, Appl. Spectr. **46** (1992) pp 25 - 27.

(3) G. Schweiger, *Optische Konzentrations- und Temperaturmessung in Aerosolen und Sprays*, Chem. Ing. Tech. **64** (1992) pp 41 - 47.