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EXPERIMENTAL INVESTIGATION OF THE EVAPORATION OF MICRON SIZED PARTICLES CONTAINING TWO COMPONENTS WITH HIGHLY DIFFERENT VAPOR PRESSURES.

R. Vehring and G. Schweiger, Fachgebiet Thermodynamik, Fachbereich Maschinenbau, Universität GH–Duisburg, Lotharstr 1, W–4100 Duisburg 1, F.R.G.

The technique of a vibrating orifice is used to generate a chain of extremely monodisperse microparticles. These particles are ejected into still air. The micro particles are composed of a highly volatile fluid and a fluid with a moderate vapor pressure.

The initial size of the particles is determined from the analysis of the MD resonances in the elastically scattered light, which is recorded while scanning the particle size over a precisely known range. A similar technique was used by Eversole, Lin, Huston, and Campillo (1990) for spherical–cavity–mode assignments. In addition the diffraction patterns generated by the interaction of the particle chain and a laser beam are used for a precise determination of the particle velocity.

Raman spectra are recorded from the particles and the surrounding gas. A two dimensional detector array is used, which allows to record the Raman-spectra of the gas phase with a spatial resolution in the μm–range. The chemical composition of the particles and the surrounding vapor is determined from the Raman spectra with a time resolution in the order of 10 μs. Very rapid evaporation processes can be therefore observed.

The MD resonances visible in the Raman spectrum of the micron particles are used to measure size changes with a precision of at least 0,1%.

Eversole, J. D., Lin, H.–B., Huston, A. L., and Campillo A. J. (1990) J. Opt. Soc. Am.A. 7; 2159–2168.

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ABSTRACTS

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