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RAMANSCATTERING ON LIQUID AEROSOL PARTICLES. SIZE AND TEMPERATURE EFFECTS. R. Vehring and G. Schweiger, Fachgebiet Thermodynamik, Fachbereich Maschinenbau, Universität Duisburg Gesamthochschule, W-4100 Duisburg, Germany.

The effect of particle size and particle temperature on Ramanscattering is investigated on evaporating droplets of water. Microdroplets were generated by a vibrating orifice generator and passed through the focal region of an argon ion laser. The spontaneous Raman spectrum of the 90° scattered light was recorded by a liquid nitrogen cooled CCD camera mounted on the exit slit of a double monochromator. The temperature dependence of the intensity distribution in the OH stretching band was used to determine the droplet temperature.The temperature of the microdroplets could be measured with an accuracy of ± 1°C in most cases. Droplet cooling due to evaporation could clearly be identified with these measurements.

The way in which the intensity of the Raman band varies with the size of the microparticles was determined. With that, the concentration of the liquid water could be derived from the Raman signal of the particles. Simultaneously the water vapor concentration in the observation volume was determined by analyzing the water vapor Raman band, which is superimposed on the OH stretching band.

The results make it possible to perform a detailed analysis of the evaporation process of microparticles of water. The method is very promising for the examination of multicomponent evaporation if water is one of the main components of the droplets.

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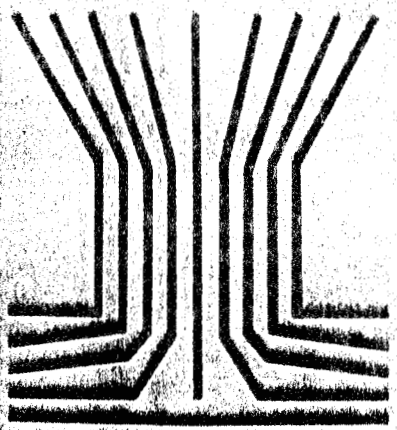

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