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Study of heat and mass transfer features for a gas-solid system at low temperatures

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Abstract

Experimental facility, representing universal vacuum spectrophotometer, is described. Kinetic regularities of gas-solid body phase transitions under low temperatures as well as spectral characteristics of typical optical surfaces covered with cryocondensate layers of different gases are studied, using this method. Methodology for determination of cryocondensate refraction coefficients, their growth velocity and spectral refraction characteristics is proposed. The experimental facility is described within the temperature range of 20 to 200 K, wavelength range of 0.2 to 20.0 μm and gas phase pressures from 10-6 to 105 Pa. Experimental results on water condensation rate on cryogenic surfaces are given along with those on optical and thermophysical properties of cryosediments.