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Investigation of vapor cryodeposited glasses and glass transition of tetrachloromethane films

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IR spectrometric studies of the processes of cryoprecipitation and the properties of thin films of cryovacuum condensates of tetrachloromethane obtained by the method of physical cryovacuum deposition were carried out. Measurements were carried out in the temperature range of 16 K - 140 K and gas phase pressures of 10^{-8} Torr – 10^{-3} Torr. The film thickness was $d = 2.5 \mu\text{m}$. The vibrational spectra of CCl_4 in the gas phase and in the condensed state were measured. For tetrachloromethane cryocondensates, it was shown that an increase in the temperature of the sample condensed at $T = 16$ K leads to a multidirectional shift of the absorption band to the "red" or "blue" region of the spectrum. Based on the obtained dependence of the position of the absorption band on the temperature of the substrate during its heating, it is assumed that in the temperature range $T = 16\text{K} - 35\text{K}$, the amorphous film of the cryocondensate is in a state of amorphous high density. Using a laser interferometer, the process of film sublimation was analyzed at a temperature above the sublimation temperature $T = 138$ K. The results obtained suggest that the evaporation of the film is accompanied by the processes of sublimation-recondensation, which, in fact, manifests itself in the interference nature of the heating curves.

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