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# IR-Investigation of Glass Transition in Thin Films of CF<sub>3</sub>-CFH<sub>2</sub> Cryodeposits

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## Abstract

In the course of our recent studies of the formation processes and properties of thin films of Freon 134a (CF<sub>3</sub>-CFH<sub>2</sub>) cryovacuum condensates, was observed, that in the temperature range from 70 K to 90 K, the sample undergoes a number of structural transformations. This is reflected both in the change of the absorption character and in absorption bands position of the IR spectra for practically all vibration modes of the CF<sub>3</sub>-CFH<sub>2</sub> molecule. This paper is a continuation of these studies and aimed get answer to the question of whether we are observing a glass transition in solid Freon 134a and what is the value of T<sub>g</sub> in this case. For this purpose, measurements at different cryodeposition temperatures of samples in the vicinity of presumed glass transition temperature were taken. On the basis presented results, and our previous obtained data the assumption of presence of structural transformations in cryofilms is made: at a temperature in the vicinity of 72 K, a classical transition takes place the glass state-supercooled liquid (G-SCL). We believe that the value of the temperature of this glass transition is approximately T<sub>g</sub>= 72 K. The temperature range from 75 to 78 K is the area of the quasi-stable SCL existence. At a temperature of about 78 K, crystallization of SCL into the state of an orientationally disordered plastic crystal-OG orientation glass begins. At a temperature T<sub>trans</sub>=80 K, a quasi-glass transition occurs from the state of the OG orientation glass to a plastic crystal with an ordered rotational subsystem of the PC. In the temperature range 83-85 K, a plastic crystal - monoclinic crystal.

**Keywords:** Freon134a, cryovacuum condensates, IR spectrometry, Glass transition

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