IMPURITY EFFECTS IN THE VISCOELASTIC PROPERTIES OF ICE NEAR THE MELTING POINT

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S u m m a r y

The effect of impurities (Na^+ and Cl^- ions) on the viscoelastic properties of ice is studied in the temperature range 210–290 K. It is established that the heating of a sample to temperatures 15–20 K lower than the melting point results in the considerable decrease of its shear modulus. The observed effect is ascribed to premelting processes. It is shown that the presence of Cl^- ions does not change the premelting temperature of ice, whereas the stress field arising around Na^+ ions introduced into ice results in its variation. The dependence of the characteristic premelting temperature T_p on the concentration of Na^+ ions is obtained. The premelting process is related to the appearance of an intermediate structure, whose degree of disorder is lower than that of water but higher than that of ice. The temperature dependence of the concentration of the intermediate structure for the objects under study is calculated based upon the experimental data.