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The Effect of Liquid-Like Layers on the Interaction of Nitric Acid with Ice Surfaces

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The "quasi-liquid layer"(QLL) is a nanoscale region of surface disorder that exists near the melting point of ice (~-30°C). The presence of this layer is believed to affect gas-ice interactions, uptake coefficients and heterogeneous chemistry in the polar regions. It is also believed that gas-ice interactions can modulate the QLL thickness and induce its formation at temperatures below -30°C.
Characterization of gas-QLL interactions is a prerequisite for a better understanding of chemistry in the polar regions and gives more accurate insights to polar atmospheric and climate models. We report results for the interaction of HNO3 with zone-refined ice. The QLL layer formation and thickness were determined using ellipsometry. Uptake coefficients were determined using a coated-wall flow tube coupled with chemical ionization mass spectrometry. Experimental data were tested against a thermodynamic model developed in our lab for the QLL on pure ice and on ice with impurities.

Please list some keywords

Zone refined ice, QLL, BL, nitric acid, ellipsometer, thickness

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