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Exploring new pathways on ice

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Snow-packs, cirrus clouds, polar stratospheric clouds, frost flowers and sea-ices can all be viewed as part of the Earth's Cryosphere. Not mere spectactors on chemistry in the atmosphere, ices often play an active role due to the presence of their surfaces, triple points and internal pores. The effects manifest as rate changes for known chemical processes as well as the promotion of "unexpected"pathways. Therefore in this talk some new results on a number of systems relevant to atmospheric processing on ice surfaces will be discussed.
The first topic concerns the influence of freezing on the chemical composition of halide ions in dilute aqueous solutions. The "freeze-enhanced"chemistry discussed is particularly relevant to the anomalously high levels of halogen oxides observed in the Polar troposphere. The focus then moves to investigations of the low-temperature reactivities of sulfur dioxide on/within ices using FT-RAIRS and TPD as probes of the chemistry. Similar methodologies are adopted for an investigation of the low-temperature photochemistry of organonitrates in the presence of water-ice surfaces. The question to be answered here is: are these long-lived compounds, which are mainly anthropogenic in origin, transformed by heterogeneous processing on cryospheric ice surfaces? Finally the dark oxidation of dissolved gaseous mercury in ice will be illustrated from experiments based on atomic fluorescence detection. Very few results on the chemical interaction between mercury and water-ices are available to the atmospheric chemistry community currently and the data obtained in this work clearly show that freezing does play an effect on the oxidation processes studied.

Please list some keywords

ice, oxidation,

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