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Intrinsic chemical transformation of iodine compounds in ice

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Ice exists ubiquitous and is one of the most important environmental media on earth. Recently, scientists found that ice is not inert as reaction media but act as reactive chemical reactor. According to Arrhenius Equation, the rate of most chemical reactions is slowed down as temperature drops. However, it is reported that several chemical reactions are accelerated by freezing compared to those in aqueous solution. Reactive iodine species (I, I2, IO, OIO, HOI) play an important roles on new particle formation (NPF) and ozone depletion event (ODE) in polar troposphere. Although the biological processes are regarded as the major source of organic and I2, the (photo)chemical mechanisms at also essential to explain the total atmospheric iodine budget. In this talk, I want to introduce enhanced chemical reaction with laboratory experimental results such as 1)accelerated oxidation of iodide(I-) in ice to produce molecular iodine(I2) and tri-iodide(I3-), 2)nitrite-induced activation of iodate(IO_3-) into molecular iodine in frozen solution. The detailed experimental conditions and mechanism will be discussed in the presentation.