

Radical-Induced Tropospheric Multiphase Formation and Degradation of Atmospheric Reactive Substances (ARS)

H. Herrmann, B. Ervens, J. Hesper and F. Wicktor
Institut für Troposphärenforschung e.V.
Permoserstr. 15, 04318 Leipzig

In this presentation an overview of formation as well as degradation pathways of atmospheric reactive substances in tropospheric chemical systems is given. The systems discussed here may be referred to as multiphase chemical systems as differentiated from heterogeneous systems. After the background for the occurrence, physical parameters describing tropospheric multiphase systems and the essentials of phase transfer are outlined, the following chemical sub-systems are to be discussed:

- HONO formation via solution phase single electron transfer to NO_2
- Sulfur (IV) oxidation, influence of transition metal ions (TMI)
- Tropospheric aqueous particle phase organic chemistry
- Ionic strengths effects

Whereas in the field of cloud chemistry many uncertainties exist, the understanding of deliquescent aqueous aerosol particle chemistry in the troposphere is even less developed. It is suggested to base models for the high ionic strengths in such systems on a combination of the use of activity coefficients (Pitzer) and, in cases where estimates of activity coefficients are not possible because of too little experimental input parameters to apply an ion-pairing model. This latter treatment will be outlined. Many of the experimentally determined primary kinetic salt effects may be explained and, later, be incorporated into combined multiphase cloud and, in the future, aerosol models. An outlook will be given.