

On the binary nucleation of NH_4SH in the troposphere of giant planets

S. Gebauer(1), A.B.C. Patzer(1)

(1) Zentrum für Astronomie und Astrophysik, TU Berlin, Hardenbergstr. 36, D-10623 Berlin, Germany

This contribution addresses the formation of solid NH_4SH (ammonium hydrogensulfide) nuclei in the troposphere of Jupiter, because based on thermochemical considerations it is believed, that a NH_4SH cloud layer exists in the Jovian atmosphere at pressure values between (1 - 2) bar beneath an outermost NH_3 cloud (cf. e.g. Rossow (1978), Weidenschilling & Lewis (1973), Atreya et al. (1999)).

Since the nominal molecule (monomer) is not present under these tropospheric conditions, the formation of NH_4SH nuclei has to be treated by application of a binary nucleation theory. The binary stationary nucleation rate of homogeneous ammonium hydrogensulfide particles is derived here based on the arguments of Mirabel & Katz (1973) and Reiss (1950). We give first results of this modelling approach and discuss further extensions and perspectives aiming at the calculation of clouds in (extra-solar) giant planet atmospheres.

References:

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