

On the Chemistry of Jupiter's Upper Atmosphere [Abstract Only]

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On the chemistry of Jupiter's upper atmosphere

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(Since this paper has been published in full elsewhere,†
the ABSTRACT only is included here)

The infrared opacity of Jupiter's upper atmosphere will be influenced by line blanketing resulting from strong absorption bands of ammonia and organic molecules. In order to calculate these effects eventually, we conduct a first investigation into the ion-molecule chemistry of the upper Jovian atmosphere. Experimental results show that intense ultraviolet radiation reacts with the constituents of the Jovian atmosphere to produce C_2H_4 , C_2H_6 , C_3H_8 , and higher polymers. The general procedure for calculating both equilibrium and non-equilibrium abundances of these products is formulated and applied to the case of the surface passage of a satellite shadow. A specific example is made of ethylene, for which an analytical approximation gives 10^{10} molecules in an atmospheric column of 1 cm^2 cross-section after a very rapid rise to equilibrium. Such a concentration of ethylene does not substantially affect the infrared radiation in the shadow.

† *Icarus*, 7, 85 (1967).