P137-006 **Room: 304** **Time: May 24 11:50-12:03**

Measurement of the reaction rate coefficient of NH3+ + H2 at T = 20-240 K

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The gas-phase ion-molecule reaction of NH_3^+ + H_2 plays an important role for production of NH_3molecules in interstellar clouds. In comparison with other ion-molecule reactions, the temperature dependence of the reaction rate coefficient {/i k} has unusual behavior. The reason of this property is thought to be caused by existence of a little potential barrier [1], where there are two reaction routes, the classical reaction route and the tunneling route, to overcome the barrier. As a result, the minimum of {/i k} appears at around 100 K. Boehringer measured this reaction-rate constant {/i k} at {/i T} = 20-300 K by the selected ion flow tube (SIFT) method [2]. Luine {/i et al.} also measured k at {/i T} = 11-20 K by the cryogenic Penning trap [3]. Since the gas pressure over 70 Pa was used to study the temperature and pressure dependence of the reaction rate in the SIFT measurement [2], the result is not necessarily corresponding to that of the Penning trap measurement which was operated at very low pressure (˜10^{-9} Pa). Especially, the theoretical value by Herbst {/i et al.} has the difference between the experimental values and one digit or more at {/i T} = 30-300 K. In order to check this inconsistency, we have measured the reaction rate constant at {/i T} = 20-240 K by using a newly developed cryogenic linear octupole RF ion trap. We report the detailed experimental method, the procedure and the results of the reaction rate measurement. The comparison to the previous values of {/i k} will also be presented.

References [1] E. Herbst {/i et al.}, J. Chem. Phys. {/b 94} (1991) 7842. [2] H. Boehringer, CPL. {/b 122} (1985) 185. [3] J. A. Luine {/i et al.}, ApJ {/b 299} (1985) L67.