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Rate Coefficients for H_3^+ Production Measured in an RF Ion Trap[1] SAM RONALD, EMILY MOUNT, NICK POPE, ADRIAN DAW, ANTHONY CALAMAI, Appalachian State University — The reaction $H_2^+ + H_2 \rightarrow H_3^+ + H$ is studied using a quadrupole radio frequency ion trap coupled with a time of flight mass spectrometer. Protonated molecular hydrogen is one of the most abundant ions in the universe, and is believed to be responsible for the formation of many molecular ions in, for example, the interstellar medium and the aurorae of Jupiter. Also, since this ion is the simplest polyatomic molecule, it can be used as a basis for comparison with other polyatomic molecules. H_2^+ is created in a RF ion trap by electron bombardment of H_2, and then allowed to react with H_2 for varying time intervals before the H_2^+ and H_3^+ populations are ejected from the trap and detected with an active-film electron multiplier. A number of different experimental parameters (H_2 pressure, trapping parameters and electron bombardment conditions) are explored and preliminary rate coefficients for the $H_2^+ + H_2 \rightarrow H_3^+ + H$ reaction are presented.

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