Abstract Submitted
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Ultracold dipolar collisions of KRb molecules[1] GOULVEN QUEMENER, JOHN BOHN, KANG-KUEN NI, SILKE OSPELKAUS, DAJUN WANG, BRIAN NEYENHUIS, MARCIO DE MIRANDA, JUN YE, DEBORAH JIN, JILA, University of Colorado — Ultracold fermionic polar molecules of $^{40}K^{87}Rb$ in their absolute rovibronic anf hyperfine state [1] have been recently created in a magnetic trap. This enables experiments to probe ultracold molecular chemistry of polar molecules [2] in well defined quantum states. In addition, KRb molecules are polar and can be manipulated by an electric field. We present theoretical predictions for ultracold dipolar collisions of indistinguishable KRb molecules in a presence of an electric field, using a simple Quantum Threshold model (QT model) [3]. We demonstrate that the KRb + KRb $\rightarrow$ K_2 + Rb_2 chemical reaction rate increases as the sixth power of the dipole moment induced by the electric field for fermionic KRb isotopes. We also estimate the temperature dependence of the chemical rates in zero electric field. These predictions are in excellent agreement with experimental data [2,4]. [1] Ni et al., Science 322, 231 (2008) ; Ospelkaus et al., Phys. Rev. Lett. 104, 030402 (2010). [2] Ospelkaus et al., arXiv:0912.3854, Science, in press (2010). [3] Quéméner et al., Phys. Rev. A, in press (2010). [4] Ni et al., arXiv:1001.2809, submitted (2010).

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