Abstract Submitted
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Isotope and vibrational excitation effects in ultracold chemical reactions[1] GAGAN B. PRADHAN, N. BALAKRISHNAN, University of Nevada Las Vegas, Las Vegas, NV 89154, BRIAN K. KENDRICK, Los Alamos National Laboratory, Los Alamos, NM 87545 — We discuss the effect of vibrational excitation on chemical reaction between $O(^1D)$ and H_2 and OH+O at cold and ultracold temperatures. The effect of isotope substitution is investigated by exploring dynamics of $O(^1D)$+D_2 reaction and comparing results against its H_2 counterpart. It is found that while vibrational excitation has a moderate effect on OH+O reaction, it has only marginal effect on $O(^1D)$+H_2/D_2 reactions. For $v = 2$ and $v = 3$ of OH it is found that non-reactive relaxation pathway is dominated by a multi quantum process than a sequential single quantum pathway. Kinetic isotope effect is determined for the $O(^1D)$+H_2/D_2 systems as the ratio of rate coefficients for H_2 and D_2 reactions and comparisons are made with available room temperature experimental data.

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