

Radiative association vs charge exchange rates in cold collisions between Rb and trapped Ca^+ , Ba^+ , Yb^+ ions

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Based on accurate quantum chemistry calculations of CaRb^+ , BaRb^+ and YbRb^+ molecular ions, we present theoretical computations of radiative association rates and charge exchange rates during cold collisions between Rb atoms and trapped atomic ions. We demonstrate that when collision partners are in their ground state, the rates are comparable for both processes in the case of Rb-Ca^+ and Rb-Yb^+ , while the radiative association is predicted to be favored in Rb-Ba^+ . Comparison between these results and ongoing experiments involving merged cold atom traps and laser-cooled ion traps are discussed.