Dynamics of the photodissociation of methylamine detecting the H-atom fragment: A velocity map imaging study

P. Recio[1], J. Cachon[1], D. V. Chicharro[1], S. Marggi Poullain[1], L. Rubio-Lago[1] and L. Bañares[1]

[1]Department of Chemical Physics, University Complutense of Madrid, Madrid 28040 Spain

* *pedrecio@ucm.es*

Due to its similarity with ammonia (NH_3) and because it has been observed in the interstellar medium[1,2], methylamine (CH_3NH_2) has received considerable attention in the last decades. It is also important in astrochemistry and astrobiology areas, since it is also a precursor of amino acids and a variety of heterocyclic molecules. Therefore, the structure and chemical reactivity.

The UV (ultra-violet) molecular photodissociation of methylamine was studied using the pump-probe method, where one nanosecond laser pulse ionized the molecule in the range of 198 to 203 nm. 10 ns later, a second laser pulse detects the H-atom fragment by a (3+1) REMPI (Resonant Enhanced MultiPhoton Ionization) scheme. The generated photofragments were detected with the velocity map imaging (VMI) technique. We have observed in the energy distribution for the different excitation wavelengths the presence of three different dissociation pathways to form H-atom fragments. In agreement with the experiments performed by other authors[3,4], the fastest two photodissociation pathways, those at higher energies, have been attributed to H + CH_3NH(X) formation in the ground state via a conical intersection (CI). In addition, thanks to our experimental resolution, we report the presence of a slower pathway. This new photodissociation pathway has been assigned to the formation of H + CH_3NH in the excited state (CH_3NH(A)).

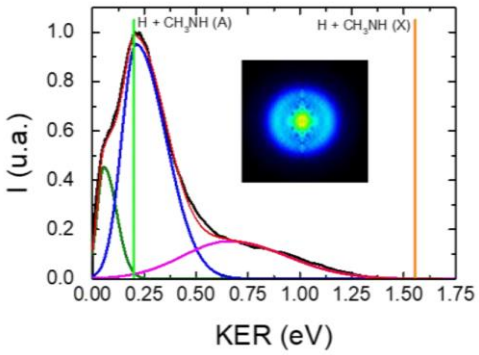

Figure. *Translational energy distribution of the H-atom fragment after the dissociation of the methylamine molecule.*

References

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