

Selective photoisomerisation of salicylic acid

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Salicylic acid is used as a precursor for the synthesis of aspirin. The molecule is flexible and presents several conformers¹, of which three were evidenced in cryogenic matrices²: conformer E is the most stable form and displays the strongest H-bond, while conformers R and H, have weaker H-bonds than the E species.

We have performed selective photo-irradiation studies of salicylic acid trapped in argon matrices to shed light on the light-induced formation of the different conformers of the molecule. While conformer E is readily formed in the matrix, conformers R and H are produced through laser irradiation. We show that selective photo-isomerisation can be performed to monitor the relative population. We also present their phosphorescence and fluorescence signatures, and their IR absorption.

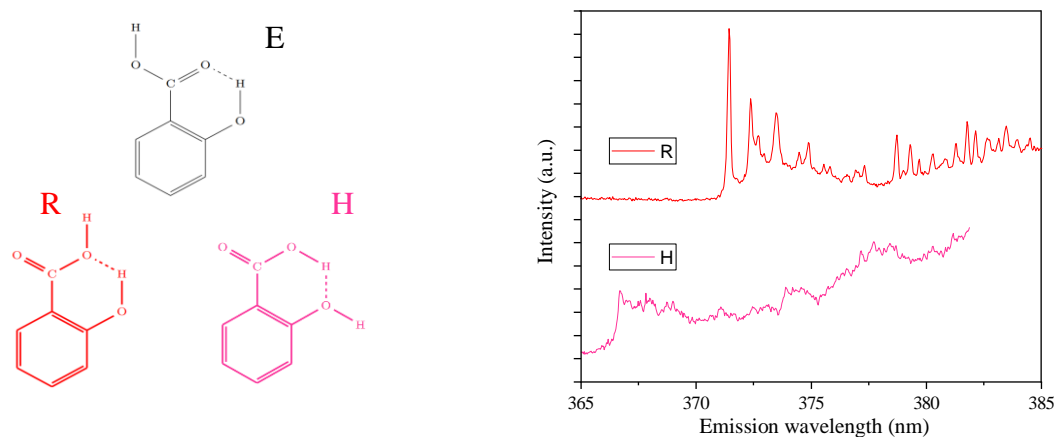


FIG 1. Left: The E, R, and H conformers of salicylic acid. Right: Phosphorescence emission spectra of the R and H conformers. Top: Form R, excitation at 315.5 nm, bottom: form H, excitation at 295.3 nm.

¹ Bisht, P.B.; Petek, H.; Yoshihara, K.; Nagashima, U. Excited state enol-keto tautomerization in salicylic acid: A supersonic free jet study, *J. Chem. Phys.* **1995**, *103*, 5290; Yahagi, T.; Fujii, A.; Ebata, T.; Mikami, N. Infrared Spectroscopy of the OH Stretching Vibrations of Jet-Cooled Salicylic Acid and Its Dimer in S₀ and S₁. *J. Phys. Chem. A* **2001**, *105*, 10673.

² Miyagawa, M.; Akai, N.; Nakata, M. UV-induced photoreaction pathways of salicylic acid: Identification of the fourth stable conformer and ketoketene–water complex. *Chem. Phys. Lett.* **2014**, *602*, 52.