PHOTODISSOCIATION OF FORMIC ACID ISOLATED IN SOLID PARAHYDROGEN

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The *in situ* photochemistry of dopant molecules isolated in solid parahydrogen (pH_2) typically differs from analogous studies in rare gas crystals for two main reasons: (1) solid pH_2 has a negligible cage effect so that photodissociation of a precursor molecule can lead efficiently to well-separated fragments, and (2) radical fragments can potentially react with the pH_2 matrix. Our group is currently studying the 193 nm photochemistry of a number of precursor molecules isolated in solid pH_2 via high-resolution FTIR spectroscopy. In this talk I will present results for the 193 nm photolysis of formic acid (FA) in solid pH_2. In rare gas matrices, the analogous FA photochemistry proceeds via the $CO+H_2O$ and CO_2+H_2 photodissociation channels.[a] In solid pH_2, in addition to these channels we observe the production of HCO and HOCO. Further, after the UV laser is turned off, the HOCO concentration continues to increase with a slow first-order rate constant for a period of 10 hours. At this point, we still do not have a full explanation of the chemical mechanism leading to the post-photolysis increase in the HOCO concentration.

[a] J. Lundell, M. Räsänen, *J. Mol. Struct.* **436-437**, 349 (1997).