

PHOTODISSOCIATION OF FORMIC ACID ISOLATED IN SOLID PARAHYDROGEN

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The *in situ* photochemistry of dopant molecules isolated in solid parahydrogen (pH₂) typically differs from analogous studies in rare gas crystals for two main reasons: (1) solid pH₂ 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 pH₂ matrix. Our group is currently studying the 193 nm photochemistry of a number of precursor molecules isolated in solid pH₂ via high-resolution FTIR spectroscopy. In this talk I will present results for the 193 nm photolysis of formic acid (FA) in solid pH₂. In rare gas matrices, the analogous FA photochemistry proceeds via the CO+H₂O and CO₂+H₂ photodissociation channels.^a In solid pH₂, 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.

^aJ. Lundell, M. Räsänen, *J. Mol. Struct.* **436-437**, 349 (1997).