

Abstract Submitted  
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**Solution Phase Molecular Dynamics Probed with Synchrotron Hard X-rays**<sup>1</sup> ANNE MARIE MARCH, GILLES DOUMY, ELLIOT P. KANTER, STEPHEN H. SOUTHWORTH, LINDA YOUNG, Argonne National Laboratory, ZOLTAN NEMETH, GYORGY VANKÓ, Hungarian Academy of Sciences, TADESSE ASSEFA, WOJCIECH GAWELDA, European XFEL — The ability to measure short-lived transient states during a chemical reaction is key to understanding many important processes such as oxygen binding in hemeproteins and electron transport in photosynthesis. Time resolved hard x-ray spectroscopies, which are based on laser-pump/x-ray-probe methods, are a unique tool because unlike UV-VIS techniques they are element specific and can provide electronic and structural information with atomic resolution in the vicinity of a particular atom or ion. These characteristics make them particularly powerful for studying molecules in complex environments such as solutions. Using a MHz, picosecond, high average power laser system implemented at Sector 7ID-D of the Advanced Photon Source [1] we have been developing time resolved x-ray emission techniques to track the evolution of photoexcited molecules in solution. We will present recent studies which include the ligand substitution reaction and hydrated electron formation in the coordination complex ferrocyanide  $\text{Fe}(\text{CN})_6^{4-}$ .

[1] A. M. March *et al.*, RSI, **82**, 073110 (2011).

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Anne Marie March  
Argonne National Laboratory

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