

Supporting Information for

Elucidating Chemical and Morphological Changes in Tetrachloroauric Solutions Induced by X-ray Photochemical Reaction

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As stated in the experimental section in the manuscript, the fluorescence is measured by an energy dispersive solid state Ge detector. It has a 20% energy resolution, meaning that at the Au L₃ edge (about 12000 eV), the resolution is ~250 eV. It is sufficient to collect the fluorescence emission without background, as can be seen on the data collected below the Au L₃ absorption edge (Fig.1 below). The fluorescence intensities presented in the manuscript are all obtained by integrating the XANES spectra from 100 eV below to 242 eV above the Au L₃ edge. The effect of the variations in the XANES structures vs time on such obtained intensities is evaluated by comparing the normalized XANES spectra. Normalization of a spectrum means that it is normalized by the absorption edge jump (Fig. 2 below). The integrations of such normalized spectra in the given energy range show negligible difference among all the spectra. The standard deviation is ~0.42 over an arithmetic mean of 164. The drop in the integrated intensity seen in Fig. 1 in the manuscript for the 2.0-mM solution is about 4%. Therefore, the XANES and first few EXAFS oscillations result in little change in the integrated intensity. This justifies the use of the integrated intensities to represent the emission intensity change.

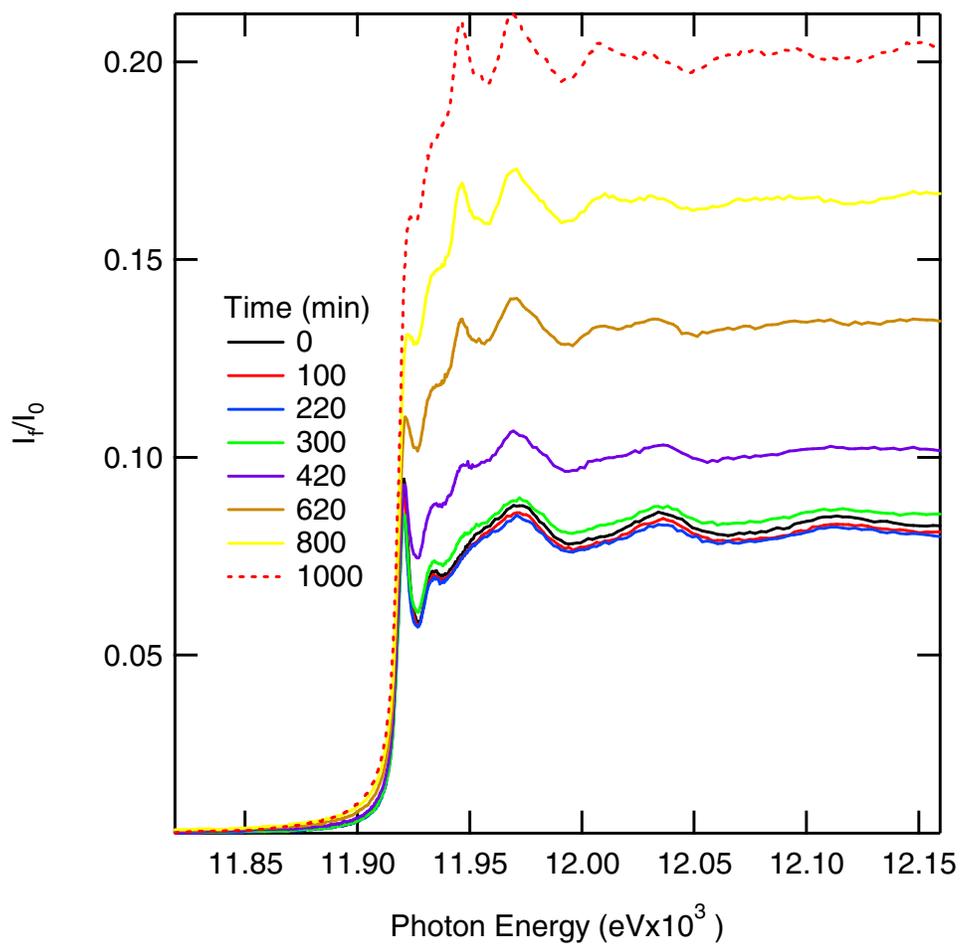


Figure 1. X-ray absorption spectra as a function of time, measured using a solid state multi-element Ge detector.

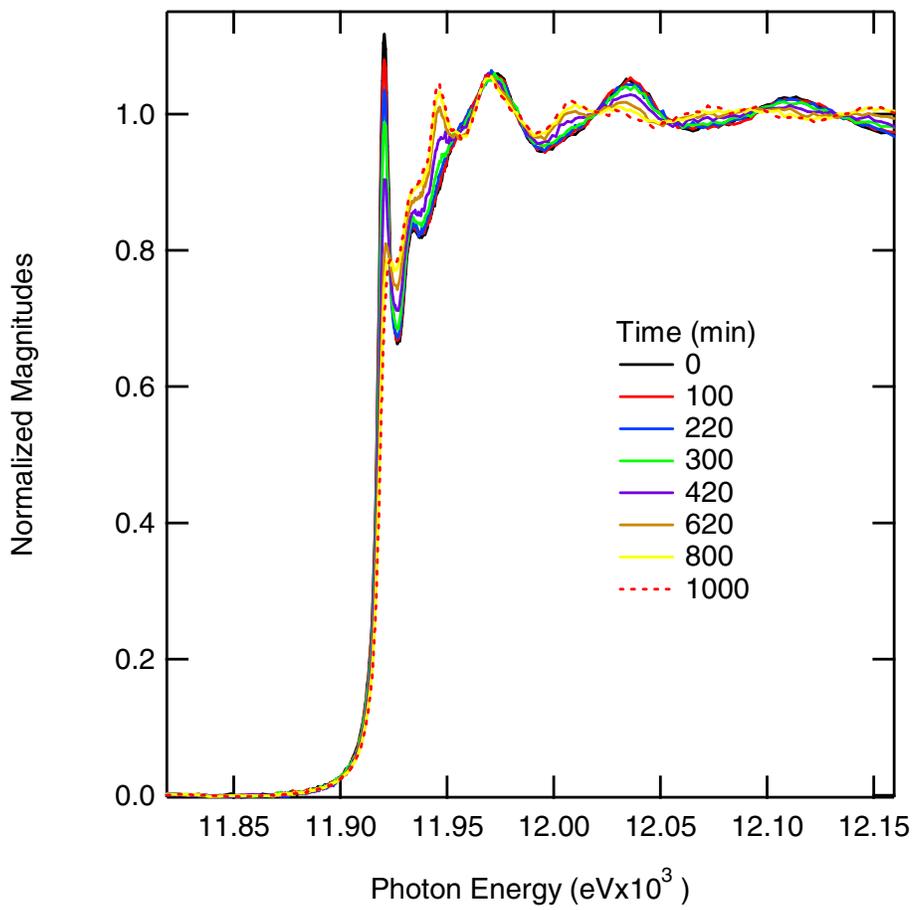


Figure 2. Normalized x-ray absorption spectra as a function of time.