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Time-resolved X-ray absorption fine structure spectroscopy measurements at PETRA III beamlines P11 and P64

Tuesday, 18 September 2018 15:00 (15 minutes)

We present the results of our time-resolved X-ray absorption fine structure spectroscopy (TR-XAS) measurements at PETRA III beamline P11 and our future plans for TR-XAS measurements at beamline P64. With time-resolved pump-probe measurements using a high intensity micrometer-sized X-ray beam on copper complexes with a specifically designed constraining or predistorted ligand geometry, also called entatic state, we found metal-to-ligand charge-transfer state lifetimes that are very short. The entatic state denotes a distorted coordination geometry of a complex from its typical arrangement that generates an improvement to its function. The entatic-state principle has been observed to apply to copper electron-transfer proteins and it results in a lowering of the reorganization energy of the electron-transfer process. Here it is transferred to photoactive complexes. Additional Raman, TR-Fluorescence and TR-UV/Vis measurements also show the same time scales making them ideal complementary tools.
Future plans are to implement a time-resolved XAS setup at beamline P64 to investigate Tyrosinase model complexes. Static measurements have already been performed and show a very promising perspective.

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