

## PROBING THE ULTRAFAST INTERMEDIATE STATES OF A DIVALENT CO-MN COMPLEX WITH FEMTOSECOND M-EDGE XANES

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In this work we perform ultrafast transient  $M_{2,3}$ -edge XANES on divalent cobalt-manganese( $N,N,N$ -tri(2-(2-pyridylamino)ethyl)amine)Cl, a heterobimetallic system with directly-interacting dual metal centers held within a non-innocent ligand scaffold. The strong metal-metal interaction facilitated by the ‘double-decker’ type ligand scaffold leads to a highly multiconfigurational electronic structure with relaxation pathways unavailable in monometallic analogues. With the ultrashort broadband probe pulse used in transient high-harmonic generation spectroscopy, we are able to perform  $M_{2,3}$ -edge XANES on both metal edges simultaneously with high specificity for each metal center and ligand environment. By combining transient XANES with transient UV-visible spectroscopy we have compiled a full picture of the electronic relaxation dynamics of this complex molecule. Photoinduced  $MM'$ CT is followed by distinct electronic dynamics at both metal edges and within the ligand scaffold, suggesting complex interplay of the Co, Mn, and ligand redox centers. Increased understanding of the relation of function to metal-specific photodynamics will help lay essential groundwork for the development of multimetallic catalysts with efficiencies comparable to those found in nature.