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EXAFS STUDIES OF THE METAL BINDING SITE IN CATALYTIC DNA SENSORS

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Catalytic sensors based on in vitro-selected, metal-specific, catalytic DNA have been produced with high selectivity for specific metals and sensitivity rivaling laboratory analytical equipment. These sensors work by binding fluorophores and quenchers to the ends of the catalytic DNA segments. When activated by exposure to the metal, the strand is cleaved and the fluorophore emits a photon. This technology can ultimately be deployed as a field-ready, hand-held device for contaminant identification in real-world aqueous systems. Despite extensive success in producing DNA-based sensors for many metals on the periodic table, very little is known about the interaction of the metal with the cleavage site. In this work, we present results of EXAFS measurements on several metal systems. In the most successful case, EXAFS can identify the bonding position on the nucleotide. In this talk, we demonstrate an approach to the analysis of EXAFS data on a complicated system about which very little is initially known. The analytical techniques discussed are easily generalized and may be applied to a wide variety of EXAFS problems.