

Abstract Submitted
for the OSF15 Meeting of
The American Physical Society

Structural Determination of Chelating Mn(II) Complexes at Variable pH using Electron Paramagnetic Resonance Spectroscopy¹

MICHAEL PETRONEK, Cleveland State University, DOROS PETASIS, Allegheny College — Chelating compounds are utilized in a variety applications due to their ability to bind around a metal complex at multiple sites. Studies have reported a hexadentate (six-point) coordinate structure when bound to Mn(II), which is the theoretical expectation for polydentate molecules. Previous results have also revealed both seven and five coordinate structures while doing similar EPR studies. This study focuses on the binding nature of EDTA, DTPA, and EGTA when bound to Mn(II). Each polydentate compound is bound to Mn(II) at pH=3,7, and 10-11 in order to determine the effects of pH on the structure on such chelating compounds. This study uses Electron Paramagnetic Resonance Spectroscopy (EPR) which utilizes the paramagnetic properties of Mn(II) to reveal the structural elements of the compounds. We have found that at an acidic pH, polydentate compound binding is inhibited which may lead to the production of lesser coordinate sites (i.e. 5-point compounds) which is due to the addition of excess H⁻ ions in an acidic solution. At both a basic and neutral pH, results appeared consistent with one another which are indicative of the expected hexadentate compound. These results are good indicators of the binding behavior of these polydentate compounds at various pH levels, but it would be prudent to study each of these compounds at a wider range of pH levels, taking advantage of intermediate ones.

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Date submitted: 28 Sep 2015

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