

# A JOURNEY ACROSS THE FIRST ROW TRANSITION METALS WITH HIGH-FIELD/FREQUENCY EPR

*Professor Joshua Telser,*

*Chemistry Program, Roosevelt University, 430 South Michigan Avenue, Chicago, IL  
60605-1394 USA*

*E-mail: [jtels@roosevelt.edu](mailto:jtels@roosevelt.edu) WWW site: <http://faculty.roosevelt.edu/Telser>*

Electron Paramagnetic Resonance at high magnetic fields (up to 25 T) and high frequencies (sub-THz: 95 - 750 GHz), known as HFEPR, has been developed over the past decade. There are many applications of HFEPR, such as in the precise determination of g-values in systems with multiple radical species (e.g., photosynthesis). Another application is in transition metal chemistry, wherein there are many paramagnetic complexes for which conventional EPR (fields below 1.5 T, frequencies up to 35 GHz) is less than ideal. Primarily, such systems are high-spin the effects of zero-field splitting can make the complex either "EPR-silent" using conventional EPR, or the EPR spectrum is not particularly informative, such as for the "g = 4.3" signal in Fe(III). We will describe the use of HFEPR to study several high spin first row transition metal complexes. We will also discuss the use of the spin hamiltonian parameters derived from HFEPR in combination with information from optical spectroscopy and ligand-field theory to understand the electronic structure of these complexes.

