

P2 CW EPR for metal centers at cryogenic temperature

The objective of this session is to illustrate the properties of EPR spectroscopy that have been presented during the EPR course: g-tensor anisotropy, determination of spin state of a metal center, spin transition, electronic relaxation properties of metal centers, influence of temperature on the EPR signal.

The main parameters (temperature, microwave power, modulation amplitude of the magnetic field) and their effect on the spectra will be presented.

Different metal centers will be studied at low temperature (10, 15, 30, 60K)

- Heme protein (myoglobin),
- Cu(II) complex model of a copper protein (Concia, Inorg. Chem. 2017)
- Fe-S and Ni-Fe centers (hydrogenase).

I. Identification of metal centers by low temperature CW-EPR

The magnetic parameters (g-tensor, hyperfine coupling parameters) will be determined, and the relaxation properties of the different centers will be compared.

Spin state transition will be illustrated in myoglobin upon addition of an exogenous ligand (azide).

II. Influence of temperature on EPR signal properties.

Temperature dependence of EPR signal intensity will be studied for the various metal centers. Curie's law or non-Curie behavior will be illustrated.

The disappearance of fast-relaxing species by relaxation broadening will be observed for heme and hydrogenase. In the case of hydrogenase, this will provide a way of selecting observable species.

