Metal centres in EPR Spectroscopy

K. Keller[1], G. Jeschke[1], M. Yulikov[1]

[1]Physical Chemistry, ETH Zurich

Unpaired electrons are the basis of Electron Paramagnetic Resonance (EPR) spectroscopy. Electron pairing is usually energetically favorable and thus only a small fraction of systems contain native paramagnetic centres or can be put into paramagnetic states to exhibit an intrinsic EPR signal. On the other hand, it allows to use EPR spectroscopy in combination with so called site-directed spin labeling (SDSL) under a wide range of conditions.[1]

In this contribution we want to give a brief overview of the use of metal ions in EPR spectroscopy in biological systems and then focus on two examples using Mn^{2+} or Gd^{3+} as spin probes. In the first case we demonstrate, what insights can be obtained from EPR by the substitution of diamagnetic Mg^{2+} to paramagnetic Mn^{2+} in a DnaB helicase.[2] In the second example we want to demonstrate advantages and disadvantages of using high spin Gd^{3+} ions for distance measurements.[3,4]

This work is supported by SNF Grant 200020_169057.

[1] G. Jeschke, *Annu Rev Phys Chem.*, **2012**; 63:419-46.
[2] T. Wiegand, D. Lacabanne, K. Keller, R. Cadalbert, L. Lecoq, M. Yulikov, L. Terradot, G. Jeschke, B. Meier, A. Böckmann, *Angew. Chem*., **2017**, 56, 3369 –3373
[3] D. Goldfarb, *Phys. Chem. Chem. Phys.*, **2014**, 16, 9685–9699.
[4] M. Yulikov, *Electron Paramagn. Reson.*, **2015**, 24, 1–31.