

Magneto-optical study toward discrimination of iron mineral in human tissues

M. Koralewski,¹ J. Żurawski,² Ch. Langkammer,³ and J. Karoń²

¹*Faculty of Physics, A. Mickiewicz University, Poznań, Poland*

²*K. Marcinkowski University of Medical Sciences, Poznań, Poland*

³*Department of Neurology, Medical University of Graz, Graz, Austria*

Our work presents experimental studies of magnetic optical rotatory dispersion (MORD) for thin slices (about 5 micrometers on quartz glass) of tissues obtained from white matter of the brain and spleen and their comparison to thin film of composite made from akaganeite mineral and PVA as well as ferritin and their mimetics aqueous suspensions. MORD data were correlated with respective absorption UV-VIS spectra and optical microscopy examination of tissues. The MORD measurements were performed at room temperature using an upgraded polarimeter P200 (Jasco), and static magnetic field, switchable from -3 to $+3$ kOe. In the investigated samples we do not observe saturation of Faraday rotation and MORD spectra do not show feature related with non-heme ferrous (Fe(II)). We observe a good correlation between MORD spectra for akaganeite composite film and ferritin and their mimetics aqueous suspensions with spectra of thin slices of both human tissue, which suggest a contribution from Fe (III). Magnetically induced rotation of the light polarization plane seems to be a promising method to study magnetic properties of human tissues in vitro.