

ABSTRACT

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Title of diploma thesis: Synthesis and evaluation of probes for fluorescent microscopy based on cyanopyridines and merocyanine scaffolds and lanthanide complexes

Fluorescence as part of luminescence is a process, which describes how electrons of suitable materials are excited by the energy absorption of a photon, followed by the immediate emission of a photon with less energy compared to the absorbed photon. Suitable compounds must contain a system of conjugated double bonds.

In this thesis, we present the synthesis and evaluation of fluorescence on derivatives of cyanopyridines, merocyanine-type fluorescent probes, and lanthanide complexes of terbium, dysprosium, and europium. Lanthanide ions have low molar extinction coefficients, therefore they cannot be excited directly, without a proper ligand. We explored the influence of pH on the emission of synthesized derivatives of cyanopyridines. We synthesized two merocyanine dyes with new alkyl moieties, which should change their emission spectra. Then, the merocyanine dyes could serve as new fluorescent probes for labelling lipid droplets.

Our idea was preparation of several lanthanide complexes with ligands containing clickable structural moieties. Click chemistry is a simple, fast procedure, which can produce 1,4-disubstituted triazoles. Lanthanide complexes with substituted triazoles performed strong fluorescence because of their even bigger system of conjugated double bonds.