Abstract of Justyna Czechowska-Kryszk's dissertation entitled "Chemiluminogenic acridine derivatives as new reagents useful in immunochemical studies".

The research presented in this paper are interdisciplinary and concerns on the physicochemical properties and applications of acridine-9-carboxylic acid derivatives, known as acridinium esters. These can trigger emission of light (chemiluminescence, CL) in chemical reaction, which made them useful in ultrasensitive analytics and biomedical diagnostics as markers and indicators, where CL measurement is used as a detection method. The emission parameters of two families of connections from the above-mentioned group - simple acridinium monoesters and more structurally complex systems - the so-called chemiluminescent tags.

As regards the first group of compounds, the scope of the research included several original salts (triflates) of 9-(phenoxycarbonyl)-10-methylacridinium, substituted in the benzene and/or acridine ring with groups with various inductive and steric effects (alkyls, halogens, CF_3, NO_2, OCH_3). Their chromatographic purity was confirmed, sufficient for spectral studies, and the composition and structure were determined using high-resolution mass spectrometry (HR MS) and nuclear magnetic resonance (NMR) techniques. Emission kinetics and integral efficiency, limits of detection/quantification and chemical stability in alkaline aqueous solutions were determined using hydrogen peroxide as oxidant. The effect of the use of different types of bases and surface-active substances on the obtained emission parameters was compared.

Concerning acridinium CL labels, four original systems of this type and one model compound available in commercial tests based on CL measurement were tested for chemiluminogenic capacity. With the participation of the above-mentioned markers, original immunodiagnostic reagents were prepared, which are covalent bonds (conjugates) of the antibody (anti-human IgG) - acridinium marker type, and their functionality in the diagnosis of toxoplasmosis - a disease of humans and animals caused by the protozoan Toxoplasma gondii - was determined. While measuring CL intensity, a quantitative analysis of T. gondii-specific antibodies was carried out with original chimeric proteins based on recombinant antigen. Analytical parameters obtained using the developed luminescent tests (CLIA type) were compared with those obtained in typical, commercially available enzymatic tests (ELISA type) using an identical diagnostic model.

It turned out that the developed CLIA test is more sensitive and better differentiates the sera of patients infected with T. gondii from healthy people. In this way, its usefulness in

immunochemical studies was demonstrated, which was the main research assumption of this dissertation.