

The content of the submitted diploma thesis is the optical determination of stability constants of supramolecular complexes of organic aromatic compounds – benzene, toluene, ethylbenzene, xylene (BTEX), and 5-fluorouracil – with β -cyclodextrin in an aqueous medium. For the determination of stability constants of the studied aromatic compounds, a method of competitive supramolecular titration was developed, which employs the fluorescence of a water-soluble PRODAN derivative (PRODAN-CH₂-OH).

Within the framework of the thesis, concentration dependencies of UV/Vis absorption and fluorescence of the fluorophore PRODAN-CH₂-OH were investigated using an optical fiber apparatus. Subsequently, measurements of fluorescence changes during supramolecular titration of PRODAN-CH₂-OH with β -cyclodextrin were performed to determine the stability constant of the PRODAN-CH₂-OH- β -cyclodextrin complex, followed by measurements of competitive supramolecular titrations of the studied organic compounds, where the examined (non-fluorescent) aromatic substances were additionally present in the previously established supramolecular system. From the measured data, stability constants for both the PRODAN-CH₂-OH complex and the studied aromatic compound complexes with β -cyclodextrin were determined using mathematical models based on 1:1 stoichiometry of the respective supramolecular complexes. The determined stability constants of the studied aromatic compound- β -cyclodextrin complexes were compared with experimental values reported in the scientific literature.

Keywords: Supramolecular complexes, host-guest interaction, stability constant, BTEX, β -cyclodextrin, PRODAN, UV/Vis absorption, fluorescence, chemosensor