

## **Abstract**

This thesis deals with two independent topics. The first is focused on the study of reversible covalent interactions of a carbonyl group with alcohols and water forming hemiacetals (respectively hydrate) derived from pyrazine trifluormethylketone. The main research method in this part is the NMR spectroscopy and experimental results are also supported by quantum chemical calculations. The second topic aims to the preparation and the study of photochemical properties of three dihydropyrazines which exhibit fluorescence both in solution and solid phase. The fluorescence can be influenced by means of complexation by various metal ions. Prepared dihydropyrazines also show interesting values of the Stokes shift. The structure of these new compounds was confirmed by X-ray analysis.