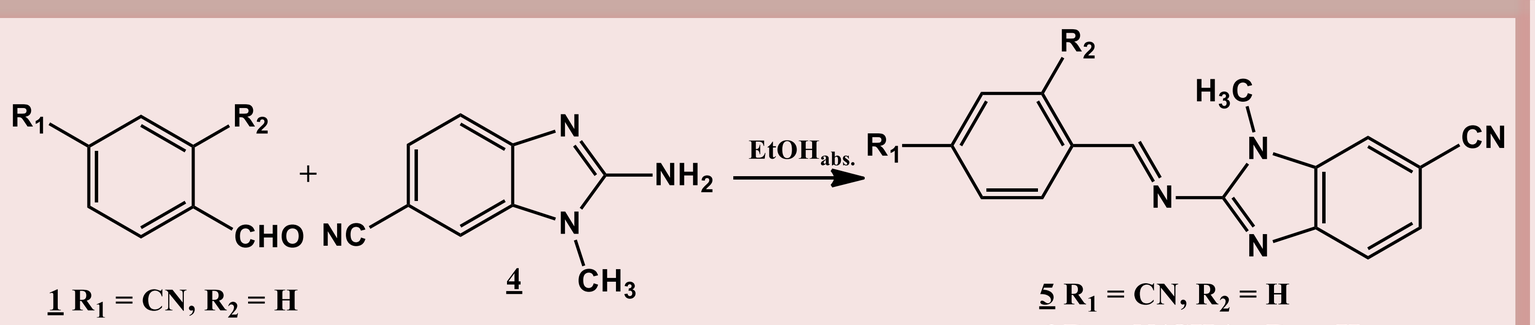
SYNTHESIS AND SPECTROSCOPIC STUDY OF NOVEL BENZIMIDAZOLE DERIVATIVES

M. Cindrić, Nataša Perin, Marija Ćurić, Petra Marketin and Marijana Hranjec

Fakultet kemijskog inženjerstva i tehnologije, Zavod za organsku kemiju, Marulićev trg 20, 10000 Zagreb, mcindric@fkit.hr

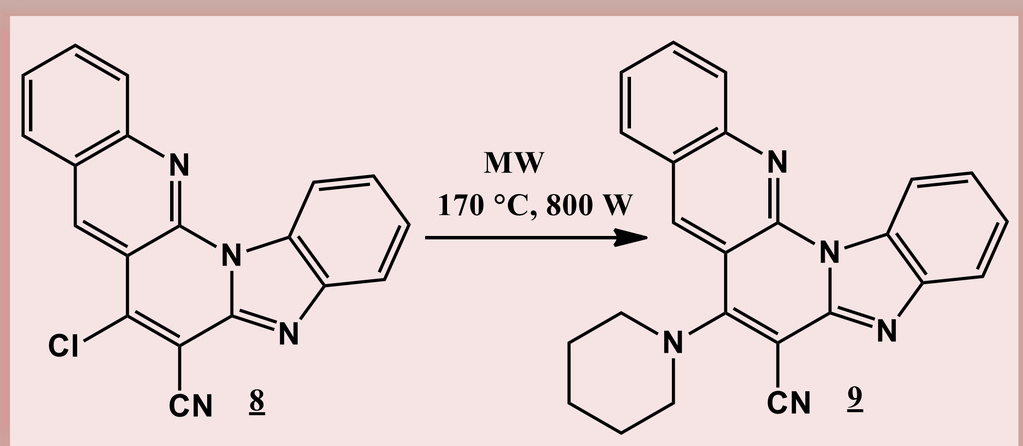
Over the past few years substituted benzimidazoles and their azino fused derivatives have been one of the most extensively studied classes of heterocyclic compounds and the constant and growing interest for their synthesis is owed mostly to their well known broad range of biological features.[1] Schiff bases are one of the most investigated organic compounds due to their excellent chelating ability and optical properties. They are frequently described as optical chemical sensors or chemodosimeters [2] with benzimidazole being often incorporated as a functional or electron accepting unit in a respective D-π-A system.



1 R_1 = CN, R_2 = H
2 R_1 = $N(CH_3)_2$, R_2 = H
3 R_1 = $N(CH_2CH_3)_2$, R_2 = H

5 R_1 = CN, R_2 = H
6 R_1 = $N(CH_3)_2$, R_2 = H
7 R_1 = $N(CH_2CH_3)_2$, R_2 = H

Scheme 1.



Scheme 2.

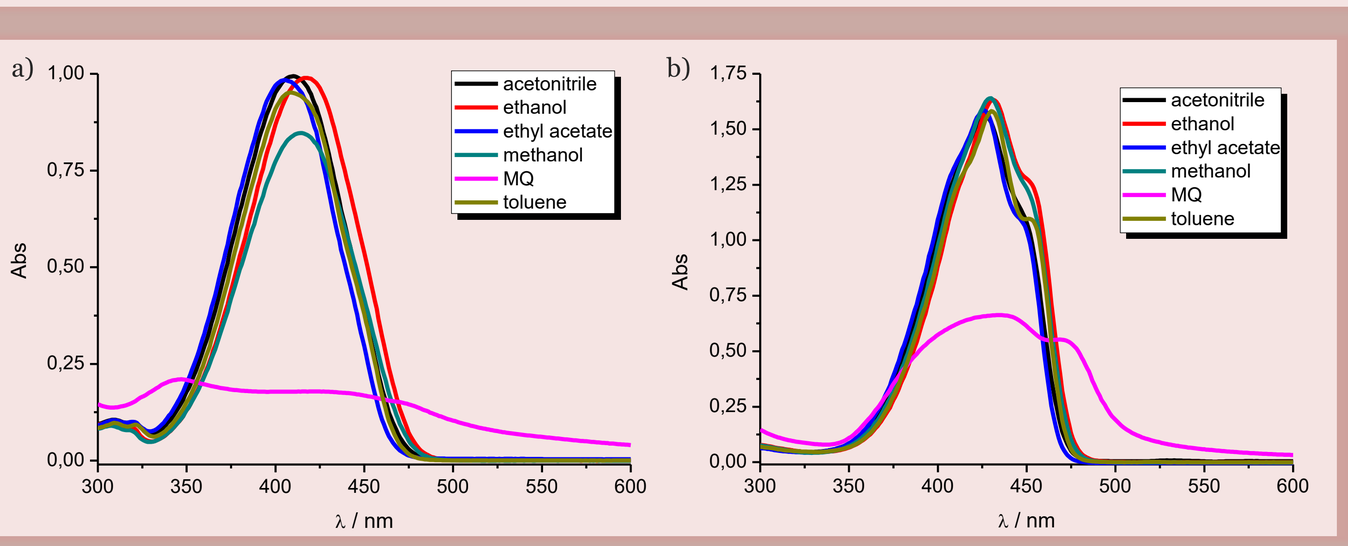


Figure 1. a, b) UV-Vis spectra of compounds 6 (2×10^{-5} moldm^{-3}) and 7 (2×10^{-5} moldm^{-3}) in polar and non-polar organic solvents.

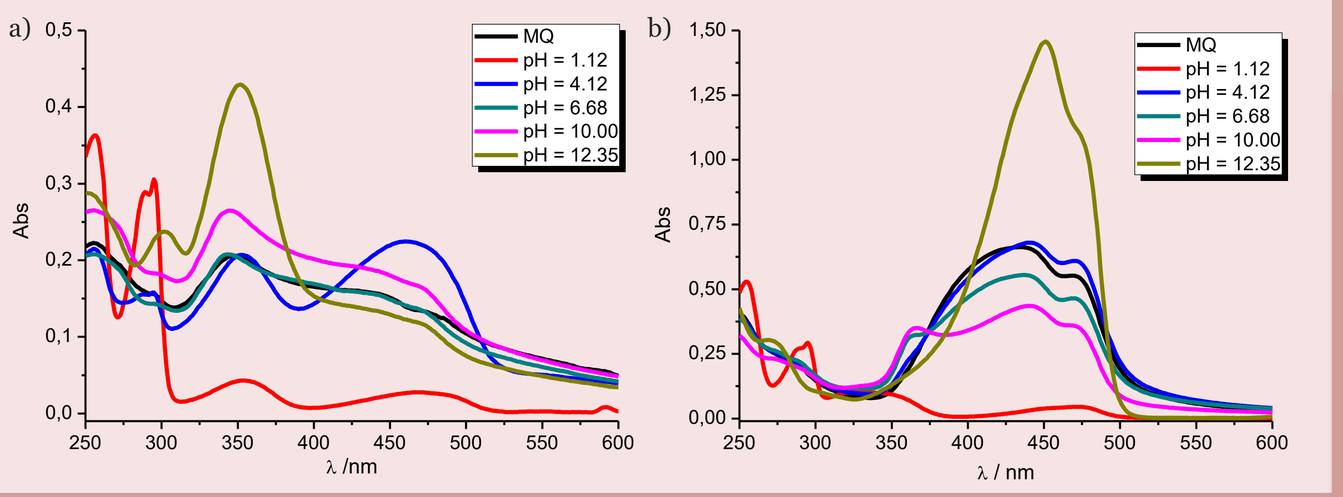


Figure 2. a, b) UV-Vis spectra of compounds 6 (2×10^{-5} moldm^{-3}) and 7 (2×10^{-5} moldm^{-3}) at different pH values

Spectroscopic characterization of prepared compounds was achived by using UV/Vis and fluorescence spectroscopy in organic solvents of varying polarities. To explore and confirm the possibility of novel compounds for their application as chemosensors for detection of metal cations in solution and/or pH, UV/Vis and fluorimetric titrations with aqueous solutions of metal chloride salts and buffers having different pH were performed.

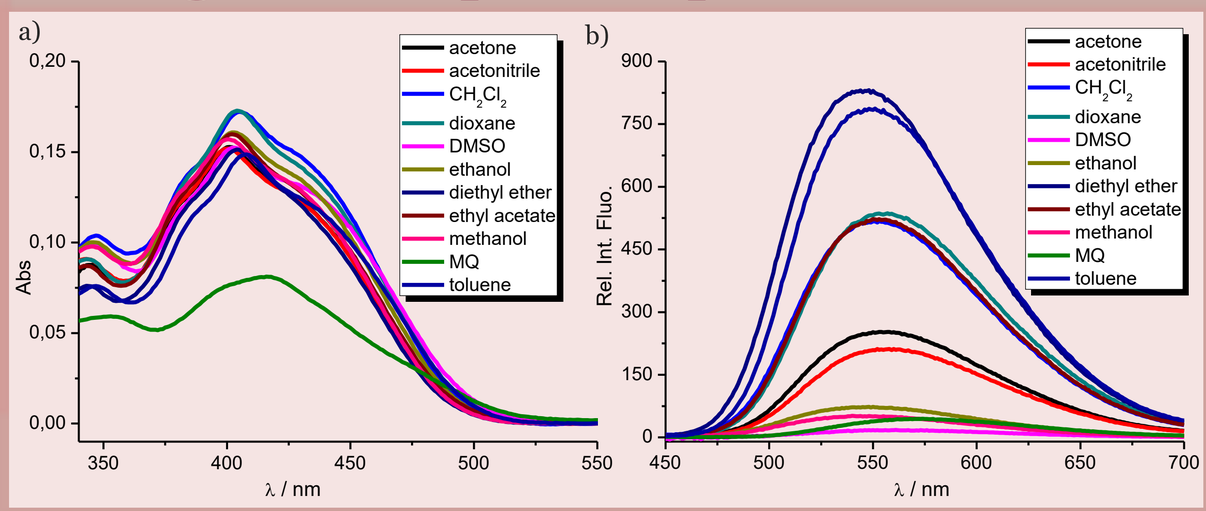


Figure 4. a, b) UV-Vis and fluorescence emission spectra of compound 9 in polar and non-polar organic solvents

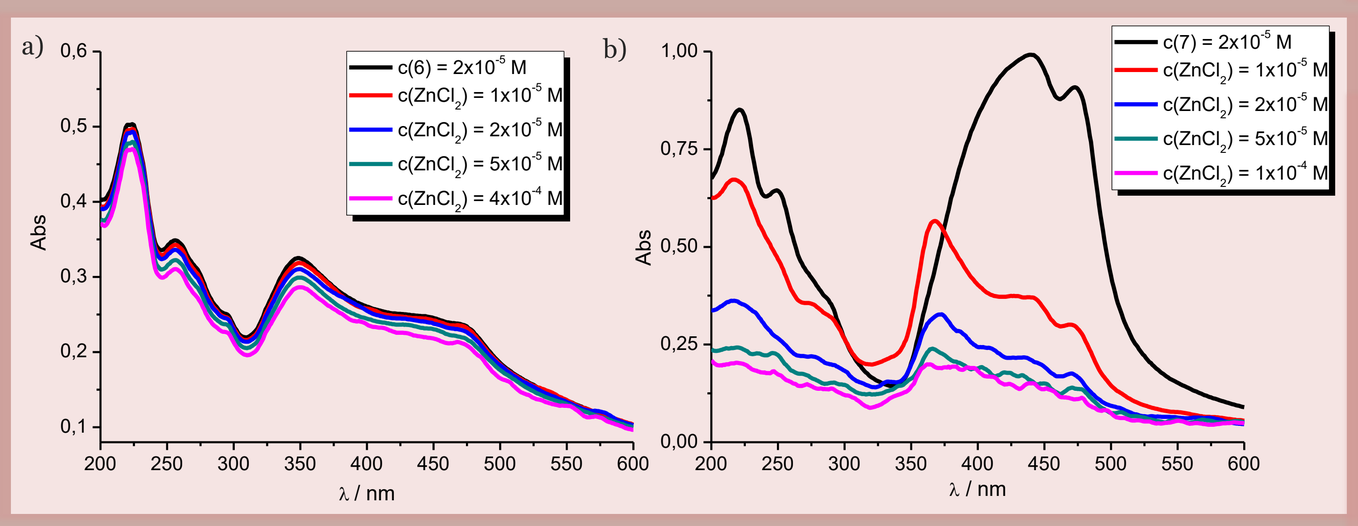


Figure 3. a, b) UV-Vis spectra of titrations of compounds 6 (2×10^{-5} moldm^{-3}) and 7 (2×10^{-5} moldm^{-3}) with Zn^{2+}

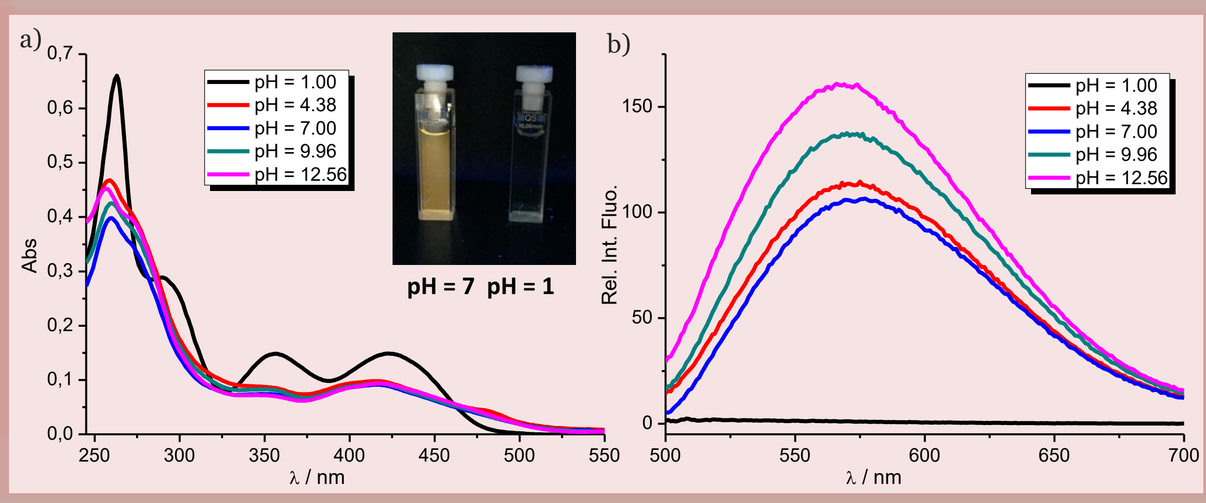


Figure 5. a, b) UV-Vis and fluorescence emission spectra of compound 9 at different pH values

[1] N. Perin, K. Bobanović, I. Zlatar, D. Jelić, V. Kelava, S. Koštrun, V. Gabelica Marković, K. Brajša, M. Hranjec, *Eur. J. Med. Chem.* 125 (2017) 722.

[2] W. Al Zoubi, N. Al Mohanna, *Spectrochim. Acta A* 132 (2014) 854; E. Horak, P. Kassal, M. Hranjec, I. Murković Steinberg, *Sens. Actuator B-Chem.* 258 (2018) 415.

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