

Chiral BINAM-containing macrocycles for enantioselective fluorescent detection

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Nowadays the identification of individual enantiomers of the bio- and catalytically active compounds is of great significance for both fundamental and applied chemistry. One of the most promising approaches for the enantiomers detection is fluorescence spectroscopy due to its high selectivity and sensitivity as well as the ability to perform an express analysis. The essential feature of this method is the interaction of the analyte molecule with the optically active fluorescent compound, *i.e.* chemosensor; the spectrum of fluorescence of the chemosensor should selectively change in respect with a chiral analyte. However, the nature of such analyte-chemosensor interaction is still unclear in most cases.

Recently we have begun successful investigation of the chiral macrocyclic compounds with endocyclic (*S*)-2,2'-diamino-1,1'-binaphthalene (BINAM) fragment as chemosensors for the selective fluorescent detection of model chiral amino alcohols [1-3].

In this work a novel series of BINAM-containing macrocycles has been synthesized. Macrocycles differ by the nature of the aromatic spacer (phenylene, naphthalene), the length of the polyoxadiazine chain, the presence of the exocyclic fluorophore groups (dansyl, coumarin, quinoline) and additional chiral substituents with nitrogen and oxygen atoms increasing the number of coordination sites of the molecules. Thus synthesized macrocycles were investigated as enantioselective fluorescent detectors of seven pairs of chiral amino alcohols, the possibility of the use of selective quenching or enhancement of the emission by one of enantiomers for detection was demonstrated. Also macrocycles were studied as fluorescent detectors for a series of 21 metal cations.

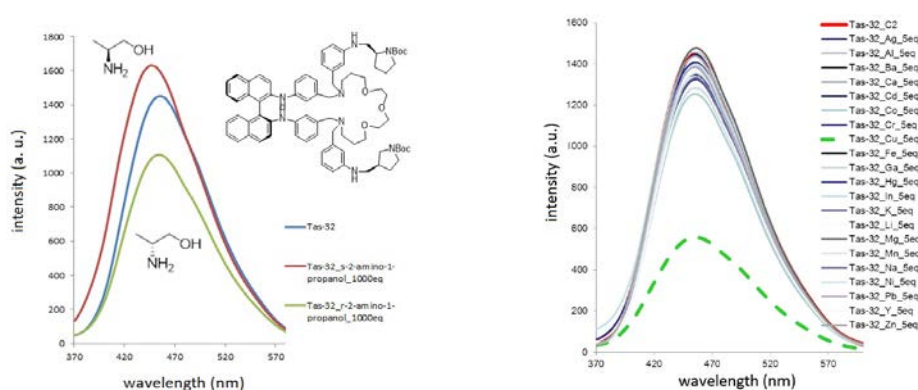


Figure 1: The changes in the spectra of fluorescence of the BINAM-containing macrocycle in the presence of the enantiomers of 2-amino-1-propanol (a) and various metal cations (b).

References

- [1] - O.K. Grigorova, A.D. Averin, O.A. Maloshitskaya and I.P. Beletskaya, *Macrocyclics* **9**, 425 (2016).
- [2] - O.K. Grigorova, A.D. Averin, O.A. Maloshitskaya and I.P. Beletskaya, *Macrocyclics* **10**, 446 (2017).
- [3] - O.K. Grigorova, D.I. Gusev, A.D. Averin, O.A. Maloshitskaya, I.P. Beletskaya, *Russ. Chem. Bull.* **68**, 848 (2019).