New Selective Fluorescent Indicator for Toxic Metal Ions

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Increased anthropogenic influence on the environment caused wide spread contamination of the surface waters with heavy metal ions and therefore development of the rapid and sensitive down to nanomolar concentrations detection methodology is important. Spectrofluorometric detection of heavy metal ions is cheap and rapid and its quality largely depends on the properties of the fluorescent probe. Herein we synthesize a new fluoroionophore, designed basing on 8-hydroxyquinoline structure. The structure of synthesized compound was confirmed using 1H NMR spectroscopy. The aim of the project was to synthesize and to review the practical application of a novel fluorescent probe, having 8-hydroxyquinoline chelating fragment, diaryloxazole fluorophore fragment and electron donating dimethylamino group in direct conjugation with electron accepting nitrogen atom of the quinoline fragment. Results: obtained sensor, 2-(8-hydroxyquinoline-4-yl)-5-(4-[N,N-dimethylamino]phenyl)oxazole, is capable of chelating heavy metal ions due to the presence of chelating cavity within 8-hydroxyquinoline fragment. The indicator is characterized by hypsochromic shifts of fluorescence maximum with hyperchromic changes of intensity towards interaction with Hg2+, Pb2+ and Cd2+. The indicator is sensitive towards cadmium, lead and mercury cations down to nanomolar concentrations. Its particular advantage is selectivity of coordination complexes formation. Obtained compound is especially sensitive to the polarity of solvents; therefore it could be used as a probe for determination of polarity of microenvironment.

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