

## Nanocomposites and nanomaterials

### Molecularly imprinted polymers (MIPs) as elements of nanosensors for phenol and bisphenol A detection

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Using the molecular recognition principle the sensor system selective to phenol and bisphenol A (BPA) molecules that is they were able to “catch” strictly given targets only, were obtained. The colorimetric easy-to-use test-systems for express detecting of phenol and BPA were developed on the acrylate base nanostructured molecular imprinting polymers (MIPs). Phenol molecules selectively adsorbed by the MIP membranes were revealed using color reaction with 4-aminoantipyrine. The intensity of the membranes staining was proportional to the phenol concentration in the analyzed sample. The detection limit of phenol detection using the developed colorimetric test-system based on MIP membranes with the optimized composition is 50 nM, while the working ranges of the test-system – 50 nM–0.5 mM. The colouring intensity of polymer film was shown to depend of BPA concentration and changed from dark crimson to slightly rose-coloured. Concentration region (4,4 –0,0068) mM was fixed within which the application of developed colorimetric test-system was the most effective. The test-system was used for the detection of phenol and BPA concentration in real samples of wastewaters. It was demonstrated that the influence of the sample matrix on the accuracy of phenols detection using the colorimetric test-system was insignificant. The results of phenols detection using the test-system were in a good accordance with those obtained by traditional spectrophotometric method. Stability of the developed test-system based on MIP membranes was estimated as 12 months. As compared to the traditional instrumental methods the developed sensor system was simple, compact, and can provide inexpensive express-analysis of the phenols and BPA in aqueous samples.

Thus, the developed colorimetric test-systems worked as a “litmus paper” and to allowed to fast detect quantitatively and qualitatively phenol and BPA in real samples of wastewaters without expensive equipment.

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