5 Conclusion

PS samples with defined macroporous structure were prepared and they were used as sensing layer in PL chemical sensors.

Concentration dependence of PL quenching response of standard PS was measured for homological set of linear alcohols in gas and liquid phase. From observed correlations of quenching sensitivity with dielectric constant and saturated vapour pressure in gas and liquid phases follows:

- PL quenching response of PS in liquid phase is controlled by dielectric strength of analyte.

- PL quenching response of PS in gas phase is controlled more by equilibrium concentration of analyte inside porous matrix. Dielectric strength of analyte is not so important.

PS surfaces were functionalized with cobalt phthalocyanine, polypyrrole, permethyl-6^{I}-heptenoylamino-6^{I}-deoxy β-cyclodextrins, methyl-10-undeceonate and by oxidation. (The work is focused on using the first three compounds.) We performed a measurement of concentration dependence of PL sensor response functionalized PS samples for selected organic species in gas phase. We can conclude that the PL quenching response was modified by functionalization of PS with selected compounds, due to change of surface polarity and molecular recognition. The magnitude of sensor response modification is dependent on kind of analyte. Another consequence for modification of PS was improvement of operational stability of PL based sensor elements.

Simultaneous measurement of PL intensity and PL decay time of PS in the presence of various amounts of organic substances in gas phase was demonstrated. Dual detection of PL parameters enabled to improve detection reliability and revealed new possibility for enhancement of the sensor selectivity to various groups of organic molecules.