

Flexible Elements of Gas Sensors Based on Conducting Polymers

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One of the most promising among sensor elements is gas sensing polymer films due to their high process ability, easy of synthesis and low cost and in some cases by better technological performances [1]. It is proposed a method of formation of the sensitive to polar gas free standing elastic films of the conjugated polyaminoarenes embedded in the polyvinyl alcohol (PVA), polyacrylic (PAA) and polymethacrylic acid (PMAA) matrices. The structure, optical and thermo mechanical properties of the obtained composite films were studied. It's shown that action of ammonia causes spectral and corresponded visible changes in the films colour. On this basis the method of obtaining the flexible colour indicators for express control ammonia content in gas environment has been developed [2]. Flexible sensor films sensitive to action of ammonia were formed on the base of conducting polymers and dielectric polymer matrices by template synthesis. It has found that content of composite and nature of polymer matrix causes a complex character of specific conductivity of composites. For composites of polyorthotoluidine, PoTI-PAA a specific conductivity achieves maximal value at 5,7-6,5% content of PoTI. With follow increasing concentration of polyaminoarene it decreasing, this may be caused by poor mechanical properties of composites. Specific conductivity of PoTI-PVA composites achieves a maximal value on the level $10^{-4} \dots 10^{-6}$ S/cm. A shape of dependence of specific conductivity from volume content of conducting polymer is evidence to percolation character of conductivity in obtained composites. With help of structure investigations is confirmed the formation of linear chains of conducting polymer in dielectric matrix due to an appearance of structure matrix effect. Existence the structure of this type provides a safety of the properties characteristics for flexible polymer matrices PVA and PAA, and also a semiconductor character of conductivity of conjugated polymers

1. B. R. Tsizh, O.I. Aksimentyeva, Ya. I. Vertsimakha, P. M. Lutsyk, M. I. Chokhan. *Molec. Cryst.&Liq. Cryst.* – 2014. – Vol. 589. – P. 116 – 123.
2. O.I. Aksimentyeva, B. R. Tsizh, M. I. Chokhan, O.M. Yevchuk . Patent № 65401, Ukraine. Sensor visual control ammonia content. – Publ. 12.12.2011, Bul. № 23.