ELECTRICAL PROPERTIES OF NANOSTRUCTURED POLYPYRROLE

ŠKODOVÁ Jitka, KOPECKÝ Dušan, VRŇATA Martin

ICT in Prague, Prague, Czech Republic, EU

Abstract
Nanostructured conducting polymers are materials with great potential for many applications, such as supercapacitors, batteries or solar cells. Interesting field of applications are chemical gas sensors which can employ theoretically higher specific surface and electrical conductivity of nanostructures for sensitive detection of gases and vapors. Thus presented work deals with study of electrical properties of nanostructured conducting polymer - polypyrrole and compares the obtained results with the known electrical properties of unstructured counterpart.

Nanostructured polypyrrole was prepared by a soft template method which uses different azo dyes for synthesis. The resulting polymer has a form of 1-D nanostructure (nanotubes, nanorods) or 3-D structure. By changing conditions of synthesis (namely temperature, molar ratio of reactants, type of azo dyes) it is possible to arrange geometry of prepared polypyrrole nanostructures (approximately tens of nm in diameter, units of μm in length). Morphology of the synthesized polypyrrole nanostructures was observed by scanning electron microscope and their dimensions were evaluated by means of image analysis.

The measurement of the electrical properties was carried out on samples of nanostructured polypyrrole compressed into tablets (diameter 13 mm) at pressure ranging from 10 to 40 kN. The electrical properties were measured by means of impedance spectroscopy (frequency range 40 Hz – 110 MHz) and by DC measurement in different environments (dry synthetic air, synthetic air containing humidity).

Keywords: polypyrrole, soft template method, impedance spectroscopy, electrical conductivity

Author did not supply full text of the paper/poster