

Indium Decorated Silver Nanowires

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Metal nanowires have broad applications in energy conversion devices, but also in medicine [1]. Silver nanowires, due to the high electrical conductivity of the metal and good corrosion resistance, are increasingly used in the electronics industry and for the manufacture of flexible electrically conductive electrodes. An important problem existing in the production of these electrodes is the strong adsorption of the polyvinylpyrrolidone (PVP) surfactant on the nanowires surface. The PVP layer leads to an increased contact resistance between the metal nanowires. A number of methods for desorption of the PVP from the nanowires have been investigated [2]. Out of these the thermal treatment and the plasma cleaning have yielded the best results. The first method cannot be applied to the electrodes with inexpensive polymer substrate and the second method involves the use of vacuum and expensive equipment. In order to reduce the contact resistance between nanowires, their decoration with metal nanoparticles having a low melting point may be a solution. In this paper the silver nanowires decoration with indium nanoparticles and the influence of temperature on the alloying process was studied by transmission electron microscopy (TEM) and energy dispersive X-ray analysis (EDX).

References

- [1] R. M. Silva, J. Xu, C. Saiki, D. S. Anderson, L. M. Franzi, C. D. Vulpe, B. Gilbert, L. S. Van Winkle, K. E. Pinkerton, Short versus long silver nanowires: a comparison of in vivo pulmonary effects post instillation, *Particle and Fibre Toxicology*, 2014, 11, 32-52;
- [2] S. F. Li, H. Y. Zhang, Effect of polyvinylpyrrolidone on the preparation of silver nanowires, *Advanced Materials Research*, 2014, 883, 940-943

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