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Electrocrystallization of silver nanoparticles from silver halides in polypyrrole evidenced by their SERS activity—thermodynamic and kinetic conditions.

Autorzy

Kamil Wójcik

Tomasz Paweł Czaja

Roman Szostak

Maria Grzeszczuk

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Silver(I) halide particles embodied in polypyrrole matrices are synthesized and further processed electrochemically to get nanoparticles of silver with significant activity in the surface-enhanced Raman spectroscopy (SERS) of the rhodamine 6G test solute, which is considered as a clear evidence of Ag nanocrystallization. The electrocrystallization of Ag nanoparticles is analyzed using redox charges of composites determined from cyclic voltammograms recorded at various time scales and/or cycle numbers. Pristine PPy/AgX and modified PPy/AgX/AgNP composites are characterized using electrochemical impedance spectroscopy, scanning electron microscopy, and X-ray electron dispersive spectroscopy. The thermodynamic and kinetic conditions of the electrochemical modification of pristine polypyrrole–AgX composites leading to the electrocrystallization of Ag nanoparticles are discussed.

Słowa kluczowe

Polymer composite, Silver(I) halides, Silver nanoparticles, SERS platform

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