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Fullerene mediated electrosynthesis of Au/C60nanocomposite

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Abstract

© 2017 The Electrochemical Society. All rights reserved. C 60 fullerene mediated electroreduction of Au(I) at potentials of the C 60 /C 60 •− redox couple was used to perform the electrosynthesis of an AuNP/C 60 nanocomposite in DCB-DMF (2:1)/0.1 M Bu 4 NCl medium. The nanocomposite consists of separate gold nanoparticles with various shapes and a mean size of ~27 ± 14 nm, as well as larger nanoaggregates of such particles, isolated in a fullerene matrix. The mean size of metal crystallites is 9–14 nm. The electrolysis occurs efficiently, and Au(I) is quantitatively reduced to Au(0) upon consumption of the theoretical amount of electricity. The resulting metal nanoparticles and the nanocomposite are not deposited on the electrode and are completely stabilized in the solution bulk. All the particles were characterized by electron microscopy methods (SEM, HR TEM) and X-ray powder diffraction (XRPD).

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