

Gold nanoparticles formation in solid polyelectrolyte: The catalytic effect of halloysite nanotubes

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Abstract

© Copyright 2017 American Scientific Publishers All rights reserved. Clay nanotubes are kaolinite rolled-up sheets, discovered few years ago and, up to now, mainly exploited as carriers for drug delivery. Although available in tons, biocompatible and nontoxic, they remain sophisticated and novel natural nanomaterials. The possibility to mix them with polymers, both polar and not, opens many functional biocomposites developments. In this paper we report a novel property of this interesting material: a catalytic effect of gold dissolution when added to a polyethylene oxide gel doped with a lithium salt. We proved that the resulting material, placed between two gold electrodes, has anisotropic features and, more interestingly, over a certain voltage threshold, can speed up the formation of gold nanoparticles coming out from the gold electrodes. Fitting the electrical measurements we also have found that gold nanoparticles contribute to the total current flow and this effect can be described by adding an intercept in the function of the current trend.

<http://dx.doi.org/10.1166/jnn.2017.13802>

Keywords

Anisotropic, Catalytic effect, Gold nanoparticles, Halloysite clay nanotubes

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