POLYAROMATIC COMPOUNDS, THIN-LAYER CHROMATOGRAPHY, SURFACE-ENHANCED RAMAN SPECTROSCOPY

WERHEID Matthias, SCHLÜTER Michael, HOLZSCHUH Matthias, BUNGE Michael, GAPONIK Nikolai, EYCHMÜLLER Alexander

Dresden University of Technology, Dresden, Germany, EU

Abstract

A variety of metal reducing microbial tissues is known, under investigation and some already applied to harvest metals from their natural minerals. Microorganisms also possess the ability to produce well-designed catalysts with attractive properties due to nanoscaled materials with defined shape and composition including a protective coating by a one step procedure.

The comprehensive characterization of the latter material is a great challenge because of the complex matrix concerning the cultivation and the microorganisms itself. Well-known methods for the investigation and analytics on nanomaterials can be destructive to the gained catalyst and their surrounding material. Approaches to handle the characterization of bio-Pd-nanoparticles, analysis of their organic coating and studies to understand their stabilization mechanism will be shown in this presentation. Nanoparticle suspensions obtained from Shewanella oneidensis and by classical colloidal synthesis have been comparatively investigated using TEM, XRD, XPS, DLS, IR, NMR and Zeta-Potential measurement vs. pH.

Microbially produced noble metal catalysts show a remarkable similarity to their chemical analogues and can be a cost-efficient alternative without the usage of effective but toxic reducing reagents like boronhydrids. They have a great potential for electrochemical energy conversion or as catalyst in synthetic organic chemistry, depending on their elemental composition. The performance of the bio-Palladium-catalyst in an environmental relevant application, due the power in the dechlorination of persistent organic pollutants, has been already tested.

Keywords: Palladium nanoparticles, microbially production

Author did not supply full text of the paper.