

TECHNOLOGY OFFER

Metal(salt)-Polymer Nanocomposites: Flexible and Cost-Effective Materials with a Broad Scope of Applications

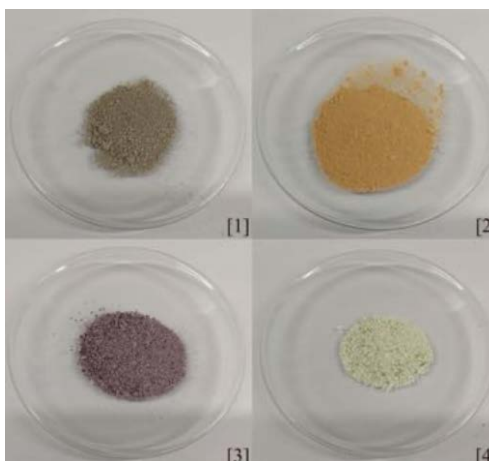
LED irradiation of aqueous or alcoholic solutions containing metal salts (Ag^+ , Cu^{2+} , Pd^{2+} , Pt^{2+} , Ru^{3+} , Rh^{2+}), monomers and a photoinitiator for radical polymerization (bisacylphosphane oxide or α -hydroxyketone) yields nanocomposites in which metal (metal-salt) nanoparticles are imbedded in a polymer network.

These materials are easily adjustable (porosity, metal concentration etc.) and are available at low costs. They can e.g. act as catalysts for organic synthesis or as conducting/metallic polymers.

BACKGROUND

During our extensive research on photoinitiators for radical polymerization, we have discovered that certain initiators act as one-electron reducing agents for a wide palette of metal salts in aqueous/alcoholic solutions. At the same time, they still also initiate radical polymerizations.

Accordingly, we have inspected the ability of these findings to produce new materials. Their synthesis is environmentally friendly (no toxic organic solvents, LED light, cheap, well available starting material), technically simple and widely adjustable



Palladium [1], silver [2], gold [3] and copper [4] divinylbenzene-co-glycidyl methacrylate composites,

TECHNOLOGY

Our Technology relies on irradiating mixtures of metal salts (Ag^+ , Cu^{2+} , Pd^{2+} , Pt^{2+} , Ru^{3+} , Rh^{2+}) in aqueous (or alcoholic) solutions, monomers (e.g., acrylates, vinylpyrrolidone), and low-cost photoinitiators. LED irradiation allows spatial and temporal control of the reaction, which is generally accomplished after a couple of minutes.

The production procedure allows producing sheets, powders, and even fibers are possible.

We have evaluated the nanocomposites as catalysts for click reactions and Suzuki coupling reactions both in batch and flow systems.

ADVANTAGES

We have developed an environmentally friendly and easily adaptable procedure for producing metal(salt)-polymer nanocomposites:

- Low cost starting materials
- Simple and rapid production of catalytically-active nanocomposites
- Broad potential of application from catalysis to materials
- Sustainable procedures

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KEYWORDS:

Nanocomposites
Catalysts

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COOPERATION OPTIONS:

R&D cooperation
Licence
Sales

DEVELOPMENT STATUS:

Prototype

STATUS OF PATENTS:

European patent pending

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