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Nano hydromagnesite as a catalyst and catalyst support for stabilization of Cu(0) and Pd(0) for green and sustainable organic synthesis

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Nano materials have been found as sustainable catalysts or catalyst supports in organic synthesis due to their unique properties including huge surface area, non-toxic nature, avoids the work up and recyclability. The E-factor and atom economy concept has played a significant role in organic synthesis in view of minimizing waste generation during the manufacture of pharmaceutical intermediates. Hydromagnesite (HM) is a hydrated basic magnesium carbonate mineral with formula $Mg_5(CO_3)_4(OH)_2.4H_2O$ with three dimensional framework of MgO_6 octahedra and triangles of carbonate ion. HM has found applications in rubber, plastic and fire retardant industry, but the catalytic potential was seldom discovered. We have been investigating the use of nano hydromagnesite as a novel solid base catalyst and catalyst support for important organic conversions. Recently, it was found that the recyclability of HM catalyst in one-pot Wittig reaction was not succeeded due to the loss of active sites in *in-situ* generated acid environment. To overcome this problem, carbon coated hydromagnesite has been designed as a truly recyclable antacid catalyst for one-pot Wittig reaction. In continuation of the studies, stabilization of Cu(0) and Pd(0) on hydromagesite sheets has been done and explored catalytic potential for various organic conversions including Suzuki, A coupling, Chan-Lam coupling reaction.

Biography

Ummadisetti Chinna Rajesh received Master's degree in Organic Chemistry from Oil Technological Research Institute, Jawaharlal Nehru Technological University (OTRI-JNTUA), India in 2009. He is pursuing PhD under the supervision of Prof. Diwan S Rawat, University of Delhi, India. He has been involved in interdisciplinary research area including nanotechnology, heterogeneous catalysis and medicinal chemistry. Till date, he has eight research papers and two patents to his credit. He has been elected as life member in Indian Society of Chemists and Biologists (ISCB), life member in Indian Science Congress Association (ISCA) and Fellow member in International Science Congress Association (ISCA).

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Dynamic analysis of boron nitride nanotube reinforced nanocomposites

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The properties like high stiffness and strength of nanotubes may be utilized for the development of future composites. The dynamic behavior of short single-walled boron nitride nanotube (SW-BNNT) reinforced composites using hexagonal representative volume element (RVE) with continuum mechanics (CM) approach and finite element method (FEM) is investigated in the current paper. CM based approach for analytical solution is used to study the mass sensitivity of composites for four different matrix materials reinforced with varying thickness (i.e. volume fractions) of short SW-BNNT. Finite element analysis is carried out by considering SW-BNNT as isotropic material and results are compared with the analytical approach. The cantilever boundary condition has been used and different masses of femtogram level (up to 10^{-3}fg) are attached at the free end of beam. It is observed from the obtained results that resonance frequency decreases with attached mass.

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