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Evolution of High-Performance Sustainable Magnesium Based Materials for Sustainable Planet Earth

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Irresponsible use of natural resources like fossil fuels and environmentally toxic technologies developed over last century has been instrumental for us to enter mass extinction even that is only sixth in last half billion years. The root cause of widespread weather disturbances particularly recordedover last 25 years is primarily attributed to the greenhouse gas emissions with transportation sector, a key player. Attempts have been initiated to reduce the greenhouse gas emissions and one relatively simpler way is using lightweight materials. Magnesium being 35% lighter than currently used aluminum provides an ideal option. In view of the tremendous potential of magnesium based materials, the present talk will focus on the recent developments in the evolution of magnesium-based materials including nanocomposites, metastable composites, syntactic composites, and magnesium containing high entropy alloys. Insight are going to be provided on their synthesis and key characteristics primarily that specialize in mechanical properties.

Environmentally friendly materials are among the foremost important materials due to the increasing environmental issues and depletion of petroleum oil. It is important for academic and as well as industry to develop the environmentally friendly polymers materials or "green materials." The environmentally friendly polymers contain polymers or their composites which are either biodegradable or biobased. Carbon-neutral lifecycle may reduce the emission of CO2 and therefore petroleum-based materials then reduce the human footprint on the environment.

In fact, significant achievements in this field have been obtained by chemists, physicists, and engineers who have recognized the importance of developing environmentally responsible materials. The white pollution caused by nonbiodegradable waste plastic packaging materials, within the paper entitled "Ingredient of biomass packaging material and compare study on cushion properties, With the optimized ingredient, the compressive strength can reach 0.94 MPa. The biomass cushion packaging material are often a perfect substitute for plastic packaging materials like EPS and EPE. The hydrogel could significantly increase the water retention capability of the soil, as well as prolonging the sustained release of water to the plants over time, without additional watering needed. Such findings suggest that the envisaged use of the hydrogel on a large scale might have a revolutionary impact on the optimization of water resources management in agriculture.

In the paper entitled "Preparation of polyaniline-doped fullerene whiskers," B. Wang et al.preparation of polyaniline emeraldine base (PANI-EB) doped fullerene (C60) whiskers (FWs) by ultrasonicating the mixture of PANI-EB/NMP colloid and FWs suspension. The authors confirmed an interaction existing between PANI-EB and FWs and suggested that the chargetransfer complex of C60 and PANI-EB was formed. "Absolutely ecofriendly amalgamation of silver nanoparticles from watery disintegrations of polysaccharides," M. A. Garza-Navarro et al. announced a totally ecofriendly union of silver nanoparticles from watery disintegration of polysaccharides.In the paper entitled "Combination and utilization of a novel polyamide singing specialist for sans halogen fire resistant polypropylene," J. Liu et al. announced a totally special scorching operator poly for without halogen fire resistant polypropylene. In the paper entitled "Readiness of upper relative atomic mass poly (L-lactic corrosive) by chain expansion," C. Liu et al. presented the combination of high atomic weight poly(L-lactic corrosive) (PLA) with hexamethylene diisocyanate (HDI) as chain extender. The high relative molecular mass PLA from sustainable resource showed good mechanical properties, which may be widely used as environment-friendly package materials.

In the paper entitled "Fourier change infrared phantom investigation of polyisoprene of an extraordinary microstructure," D. Chen et al. revealed the expository reaction to various microstructure substance from common elastic trees including cis-and trans-1,4-polyisoprene upheld the Fourier change infrared (FTIR) range.The variation of microstructure content in natural polyisoprenes can be determined by FTIR with good correlation. Magnesium based materials were actively used during war 2 time in defense, automobile, and aerospace sectors. The Severe plastic deformation processing is still in the initial stage of development and will need more time to mature to industrial level. Addition of nanoparticles in lower amounts (typically < 3%) is another method that ensures almost no weight penalty (density of nanoparticles is generally above magnesium) in comparison to micron size reinforcement which are used in larger amounts (15-25%). Depending on the sort of matrix selected, magnesium based composites are often utilized in both as-cast and wrought forms. Magnesium based nanocomposites can easily be plastically deformed, for instance, using hot extrusion to understand simple or complex shapes as needed by end applications. Various research studies have shown that nanoparticles based on oxide, carbide, nitride and boride families and carbon based reinforcement such as carbon nanotubes (both single and multiwall), graphene and nanoplatelets are often successfully wont to strengthen pure magnesium and its alloys. Properties such as ambient and high temperature strengths, ductility, fatigue, creep, oxidation and wet corrosion resistance can be signifcantly enhanced. It may however be noted that different types of reinforcement have different capabilities even if they fall within same family (such as oxide family). This necessitates the experimental validation for each matrix and reinforcement combination. In the event that nano-fortification is added to unadulterated magnesium can unfavorably influence the wet consumption obstruction by filling in as cathodic site while it can improve wet erosion opposition of an amalgam by antagonistically influencing the precipitation of cathodic accelerates. Initial studies conducted on machining of nanocomposites revealed encouraging leads to terms of cutting force, machining speed and gear wear. Experimental research conducted thus far indicates the necessity for more fundamental understanding of the scientifc concepts that govern the behavior of magnesium based nanocomposites. Magnesium based materials isn't an issue as magnesium is non-poisonous, and challenges stay to guarantee that the new magnesium based materials are created with alloying components and fortifications that don't represent any damage to nature. Another test that is looked by magnesium nanotechnology is to

upscale the handling techniques to mechanical level so these captivating and promising materials can be utilized increasingly more in building and furthermore in the biomedical applications for the prosperity of planet earth and living beings. Accordingly, this paper will focus on the development of magnesium based nanocomposites fit for supplanting traditional materials in different building and biomedical applications.