Research & Reviews: Journal of Material Sciences e-ISSN: 2321-6212

Nanomaterials In Microfabrication Research

Joanna Erlich*

Department of Applied Physics, Oregon Health and Science University, Portland, USA

Editorial

Received: 05-Jan-2022, Manuscript No. JOMS-22-52327;
Editor assigned: 07- Jan -2022, PreQC No. JOMS -22-52327(PQ);
Reviewed: 19- Jan -2022, QC No. JOMS -22-52327;
Revised: 21- Jan -2022, Manuscript No. JOMS -22-52327(R);
Published: 28- Jan -2022, DOI: 10.4172/2321-6212.10.1.e003.

***For Correspondence:** Joanna Erlich, Department of Applied Physics, Oregon Health and Science University, Portland, USA.

E-mail: joannaerlich@gmail.com

DESCRIPTION

Nanomaterials are the materials with a single unit that is between 1 and 100 nanometers in size (in at least one dimension) (the usual definition of nanoscale). Nanomaterials research uses improvements in materials metrology and synthesis gained in support of microfabrication research to take materials science-based approach to nanotechnology. Nanostructured materials often exhibit unique optical, electrical, thermo-physical, and mechanical capabilities. Nanomaterials are slowly but steadily getting commercialized and emerging as commodities. Nanomaterial is described as "material with any outward dimension in the nanoscale or having internal structure or surface structure in the nanoscale" in ISO/TS 80004. Nanoscale is defined as "length range approximately from 1 nm to 100 nm" in ISO/TS 80004. This encompasses both nano-objects, which are discrete pieces of material, and nanostructured materials, which have internal or surface structure on the nanoscale; a nanomaterial may be a member of both these groups.

The European Commission adopted the following definition of a nanomaterial on October 18, 2011: "A natural, incidental, or manufactured material containing particles in an unbound state, as an aggregate, or as an agglomerate, with one or more external dimensions in the size range 1 nm – 100 nm for 50% ormore of the particles in the number size distribution. The 50 percent number size distribution criterion may be substituted by a threshold between 1 and 50 percent in specific instances where concerns about the environment, health, safety, or competitiveness demand it “From ten percent to fifty percent.” Engineered nanomaterials have been designed and created by humans with certain features in mind[1-3].

Legacy nanomaterials are ones that were in commercial production before nanotechnology as incremental improvements over traditional colloidal or particulate materials. Carbon black and titanium dioxide nanoparticles are among them. Through combustion and vaporisation, incidental nanomaterials can be created unintentionally as a result of mechanical or industrial processes. Vehicle exhausts, smelting, welding gases, and combustion processes from home solid fuel heating and cooking are all sources of accidental nanoparticles. Fullerenes, for example, are a type of nanomaterial produced by burning gas, biomass, or a candle. Wear and corrosion products can potentially produce it as a byproduct. Incidental atmospheric nanoparticles, also known as ultrafine particles, are particles that are formed unintentionally during a deliberate activity and may contribute to air pollution[4-7].

Natural, functional nanoparticles are frequently found in biological systems. Natural organic nanomaterials include *foraminifera* (mainly chalk) and viruses (protein, capsid), wax crystals covering a lotus or nasturtium leaf, spider and spider-mite silk, the blue hue of tarantulas, the "spatulae" on the

bottom of gecko feet, some butterfly wing scales, natural colloids (milk, blood), horny materials (skin, claws, beaks) Natural inorganic nanoparticles form as a result of crystal formation in the Earth's crust's various chemical conditions. Clays, for example, have complex nanostructures due to anisotropy in their underlying crystal structure, and volcanic activity can produce opals, which are naturally occurring photonic crystals with a nanoscale structure. Fire represents especially complex reactions and can produce pigments, cement, fumed silica etc. Forest fires, volcanic ash, ocean spray, and the radioactive disintegration of radon gas are all natural sources of nanoparticles [8-10].

REFERENCES

1. Sánchez-López E, et al. Metal-based nanoparticles as antimicrobial agents: An overview. Nanomaterials. 2020;10:292.

2. Fang M, et al. Antibacterial activities of inorganic agents on six bacteria associated with oral infections by two susceptibility tests. Int J Antimicrob Agents. 2006;27:513-517.

3. Chen R, et al. Antibacterial activity, cytotoxicity and mechanical behavior of nano-enhanced denture base resin with different kinds of inorganic antibacterial agents. Dent Mater J. 2017;36:693-699.

4.Chernousova S, et al. Silver as antibacterial agent: Ion, nanoparticle, and metal. Angew Chemie - Int Ed. 2012;52:1636-1653.

5. Hamad A, et al. Silver Nanoparticles and Silver Ions as Potential Antibacterial Agents. J Inorg Organomet Polym Mater. 2020;30:4811-4828.

6. Zhang W, et al. Chemical transformation of silver nanoparticles in aquatic environments: Mechanism, morphology and toxicity. Chemosphere. 2018;191:324-334.

7. Liu J, et al. A review on bidirectional analogies between the photocatalysis and antibacterial properties of ZnO. J Alloys Compd. 2019;783:898-918.

8. Jiang S, et al. ZNO NANOMATERIALS: CURRENT ADVANCEMENTS IN ANTIBACTERIAL MECHANISMS AND APPLICATIONS. Front. Chem. 2020;8.

9. Liu L, et al. Facile preparation PCL/ modified nano ZnO organic-inorganic composite and its application in antibacterial materials. J Polym Res. 2020;27.

10. Espitia PJP, et al. Zinc Oxide Nanoparticles for Food Packaging Applications. Antimicrobial Food Packaging .