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Abstract

Manufactoring of metallic nano materialsuse electrochemical technology with the DC high voltage

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Abstract:

Metallic nanoparticles are usually prepared by physical, biological and chemical methods. Physical methods use complex devices to create lasers, gamma rays that affect on metal or remove metal salts. Chemical and biological methods must also use metal salts, such as AgNO3 and reducing agents or plant extracts with reducing properties. The metal nanoparticle products which are made from the above mentioned methods, contain anions of salts as well as residual reactants and intermediate products of redox reaction process or additional stabilizers substances that will affect to the safe use process for human health. The electrochemical method uses only metal anodes such as Ag, Au, Cu, Fe and the DC high voltage in the solution of distilled water, therefore, the metal nano product is complete pure and it is very safe to use.

Preparation of metallic nanomaterials by the DC high voltage electrochemical technology has been studied the influences of modulation technology parameters such as: voltage value, current and voltage stabilization mode, distance between anode and cathode electrode, conductivity and pH as well as temperature of the distilled water solution. The anode electrodes studied as Ag, Au, Cu, Fe, W which have their own characteristic due to affectting from metallic nature and lead to electrochemical reactions on electrodes as well as the process of electroplating plasma have the difference results. The process of creating metallic nano by high voltage

electrochemical reaction even in distilled water is determined by the anodic electrochemical reaction of the metals and the process of release hydrogen on the cathode from the electrolysis of aqueous. Metallic ions are reduced with fresh formation hydrogen gas in solution by the following reactions:

Me -ne Men+

2H2O + 2e H2+ 2OH-

Men+ + nH2 Me0 + 2nH+

With the high voltage and release gas on the electrode and when the temperature of the solution increases with strong electricity and magnetic fields, the plasma will be formation, plasma dissociates water and creates large amounts of hydrogen and oxygen gas, in addition, chemistry plasma generate also the free radicals that has strong oxidizing properties and to be used

for purpose of environmental pollutant

Biography:

Nguyen Duc Hung was born in 1946 in Binh Dinh, Vietnam and is a professor of electrochemistry (from 1991) and is currently researching at the Institute of Environmental Technology. He earned his bachelor's degree at Hanoi University (1964-1968), his doctorate (1972-1975) and his doctorate of science (1982-1985) at TU Dresden. He practiced science at ETH Zürich 1978-1979. He participated in research and postgraduatetraining in the field of electrochemistry and metal corrosion protection and received the state science and technology awards in 1991, 1996, 2000, 2005, 2009 for his research and application in this field. For more than 10 years, he has focused his research on electrochemical reactions with high-voltage DC currents in the water to prepare silver nanoparticles and other metals for antibacterial and environmental pollution treatment.

Recent Publications:

1. Nguyen Duc Hung et al; Millimeter Wave Power Transfer to an Autonomously Controlled Micro Aerial Vehicle, 2020.
2. Nguyen Duc Hung et al; The Logistics System by Rotary Wing Unmanned Aerial Vehicle with 28GHz Microwave Power Transmission, 2019.
3. Nguyen Duc Hung et al; Research on Beam-Motor Coordinated Control for Wireless Power Transfer, 2019.
4. Nguyen Duc Hung et al; Autopilot Drone with Rectenna for 28GHz Microwave Irradiation Measurement, 2018.
5. Nguyen Duc Hung et al;Experimental Study for Aerodynamic Performance of Quadrotor Helicopter, 2018.

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