

the findings of the research have shown that long-term experiments have been proven by the fact that the length period of the composite armatures than the steel armatures is three times more.

Failure to Use Composite Armature in Construction:

when the temperature of the composite armature exceeds 6000 °C, the internal fibers break out and, as a result, these fixtures lose their strength;

composite armatures can not be welded by means of a simple electric welding machine, such as steel fittings, which in turn indicates that it needs to do specific work.

the use of composite armature deformation in flexible elements should be proven by experiments;

Composite armatures are a modern building material in modern times. It can be used for the construction of low-rise buildings, but the use of such fixtures in the construction of multi-storey buildings implies long-term experiments and requires design indicators. It is not advisable to use composite fixtures in multi-storey buildings, as these fixtures are deformative and are considered to be relatively safe for use in multi-storey buildings.

UDC 544.77.051; 553.9.15; 664.8.014/019

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“GREEN” SYNTHESIS OF SnO₂ NANOPARTICLES

Recently one of important research field was nanoscience which contains emerging technologies with interdisciplinary fields like physics, chemistry, biology, material science, and medicine. There was major need for eliminating harmful reagents and to provide efficient green synthesis of nanoparticles was mostly used. Bio-directed synthesis of nanoparticles shows valuable interest to various research fields such has biologists, chemists, materials scientists and also to find greener methods of inorganic material synthesis. Transition metal nanoparticles were gaining importance due to their phyto-synthesizing property which resulted in biocompatibility, low toxicity, green approach and environmental friendly nature. SnO₂ nanoparticles has a direct optical band gap of 2.5–3.4 eV energy due to it can act has a p-type semiconductor metal. The SnO₂ NPs were applied in the area of solid state gas sensor, solar cells, rechargeable Li batteries and optical electronic de-

vices. The success in many of its technological applications depends on crystalline SnO₂ with a uniform nanosize pore structure [13]. Efforts toward the development of tin oxide nanomaterials with high sensitivity, excellent selectivity, quick response and recovery behavior to gases has increased over years.

There are many methods like energy ball milling method, homogenous precipitation, hydrothermal, sonochemical, solvothermal, microemulsion and sol-gel for synthesizing SnO₂ nanoparticles. But these methods lead to some toxic effects to the environment and human health due to the effect of usage of toxic solvents and chemicals.

Green synthesis of metal oxide nanoparticles is an area of interest having significant focus in present scenario with important objective of facilitating the manufacture of nanotechnology based products eco-friendly and safer for all beings with sustainable commercial viability. However some surfactants are toxic and lead to impurities in the final product and hamper the application of these nanomaterials in electronic and sensing devices. The surfactants have to be removed by burning the samples at higher temperature to improve thermal stability and the purity of the tin oxide for catalysts and electrochemistry.

Antioxidants play an important role in the functioning of all bio systems. In biological systems; free radicals are generated due to interaction of biomolecules with molecular oxygen which results in the degradation of biomolecules. The antioxidant activity of the synthesized sample is explored by monitoring the total antioxidant capacity. The total antioxidant capacity of the extract was assessed with the help of the phosphomolybdenum method, which is based on the recovery of Mo (VI) to Mo (V) by means of the extract and, consequently, the formation of a green phosphate complex/Mo (V) at an acidic pH value.

Our objective in this work is to reduce tin chloride to tin oxide nanoparticles using a biomaterial that addresses two major factors, the need for the biomaterial to be environmentally benign and produce no toxic industrial waste and for it to be cost-effective and easily produced.

To achieve this goal, the authors solved the following tasks: – to obtain an aqueous grape skin extract (GSE) in conditions of a short-term action of low-temperature plasma discharge and to study its componential composition and antioxidant properties;

– to determine the conditions for obtaining nanosized mono-(SnO₂)NPs with the help of plasmochemically obtained aqueous/ ethanol (EtOH) grape skin extracts.

For synthesis of SnO₂ nanoparticles we choose ethanol (EtOH)/water extract which contains high nutritive value in it, because SnO₂ was one of

the high sensitivity materials for sensor applications that too mainly towards reducing gases.

$\text{SnCl}_4 \cdot x\text{H}_2\text{O}$ was procured from sigma Aldrich. All glass wares were cleaned with aqua regia and rinsed several times with de-ionized water. 30 ml of bidistilled water and 20 ml EtOH were added to 1 g of dry grape skin powder and stirred. The resulting mixture was placed in a plasmochemical reactor. The scheme and the principle of the plant operation are given in [1]. The mixture was treated for 5 minutes (at the amperage of $I=120$ mA and $P=0.8$ MPa), cooled and filtered. To the 20 mL of ethanol (EtOH)/water extract, 80 mL of stannous chloride solution was mixed.

A wide range of compounds was found in the plasmochemically obtained aqueous extract of the grape skin extract. The present phenolic acids, namely: gallic acid (9.1 %), hydroxymethylfurfural (4.7 %), 3,4-dihydroxybenzoic acid (4.5 %), 4-hydroxybenzoic acid (3.2 %), 3,4-dioxy-cinnamylic acid (2.2 %); anthocyanins (34 %) structurally representing glycosides at the 3-position anthocyanidins: malvidin, delphinidin, petunidin, peonidin and cyanidin. The flavonol group is represented by quercetin and its derivative quercetin-3-O-glucoside. The extract contains catechin, epicatechins and epicatechin gallate. The obtained data testify to the presence of antioxidant properties in the plasmochemically obtained grape skin extract. The total antioxidant activity is 571 ± 1.38 mg of AsA/g of the extract.

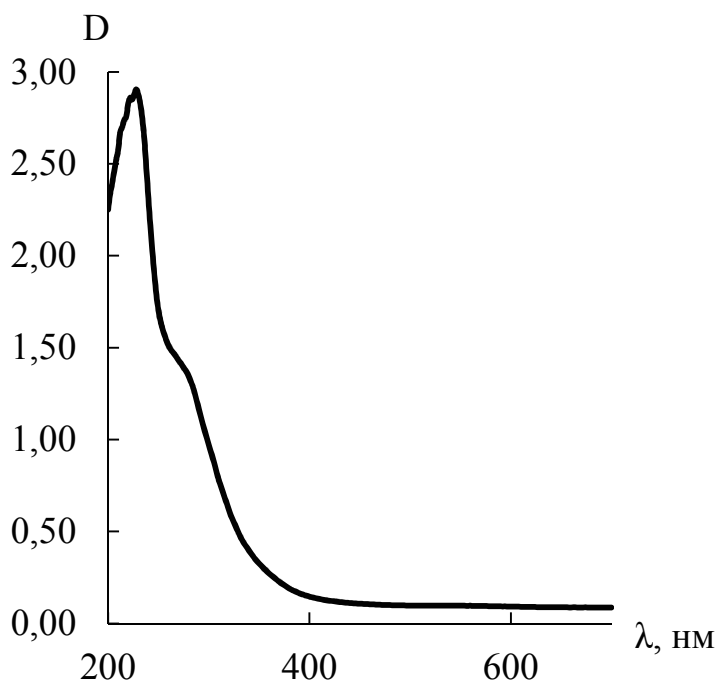


Fig.1. UV – visible spectrum of SnO₂ nanoparticles.

The formation of SnO₂ nanoparticles was monitored with the help of UV–visible spectroscopy. The absorbance of the reaction was recorded from 200 to 800 nm. This shows the clear Surface Plasmon Resonance (SPR) with the absorbance at the peak range of 224 nm (Fig. 1). Also the SPR value was compared with the literature [2-3], it clearly confirms the formation of SnO₂ nanoparticles. For semiconducting materials (SnO₂ NPs), the quantum confinement effect is expected, and the absorption edge will be shifted to higher energy when the particle size decreases. The value of absorption edge sample is 224 nm.

The SnO₂ NPs were synthesized using ethanol (EtOH)/water extract without introducing toxic elements to the environment and also it said to be one of the cheapest methods for synthesis of nanoparticles. Further various environmental applications such as dye degradation were proved.

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UDC 620.193

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THE ELECTROCHEMICAL BEHAVIOUR OF ENVIRONMENT-FRIENDLY INHIBITORS IN CORROSION CONTROL OF CARBON STEEL IN NEUTRAL SOLUTION

Recently, the development of green corrosion inhibitors and green inhibition strategies are highly demanded because of the increasing demand of