

SEMICONDUCT CRYSTALS FOR ELECTRONICS APPLICATIONS

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ABSTRACT

Daily activities are increasingly intertwined with communication and the development of electronics for information exchange. A bioremediation process was developed, resulting in a crystallized product with semiconductor potential. The **objective** of this process is to characterize and validate for commercialization a semiconductor raw material product derived from oil-contaminated mangroves with potential in the microelectronics industry.

METHODOLOGY

The patented formulation was quantified and subjected to temperatures of up to 87°C for 3 minutes with agitation. After resting, the fungi were inoculated into sealed Petri dishes for proliferation. They were replicated in 1,600 kg of mass in ten (10) glass plates, 40 x 40 cm with lid and sealed. Remaining for three (3) months for biotransformation in prototype. The fungi *Aspergillus tamari* and *Fusarium solani* are deposited at the C.C.T. of the André Tosello Foundation, SP. Scanning Electron Microscopy (SEM) by Energy Dispersive Spectroscopy (EDS) elemental characterization was performed. It was analyzed in NANOSIZER (nm), whose spherical nanoparticle size is measured by dynamic light scattering, detected by the Zeta Potential. There was an investigation of nitrogen for proteins. Differential Scanning Calorimetry (DSC) was analyzed for the stability of protein or other biomolecule in its native form; 0.2 g of the sample was weighed; scanning rate of 10 °C/min; nitrogen atmosphere; it was heated from 25 °C to 600 °C; The data were processed with OriginLabOriginPro 8.1.88.89 SR2 software. 3 mg of the sample was used for 100 kJ of KBr. FTIR infrared spectroscopy analysis indicated amides and organic molecular compounds.

RESULTS

In SEM, the composition: carbon, oxygen, silicon, potassium, calcium, sulfur, and others. In NANOSIZER (nm), the mean hydrodynamic distribution of the nanoparticles measured by scattering showed an average size of 61.44 nm. In organic nitrogen for proteins, an average of 0.96% was obtained for three samples (Σ 5.98 and standard deviation of 0.17), sterile samples. For DSC, a spectrum was obtained, with exothermic events characteristic of carbon nanotube crystallinity. The endothermic peaks identified are temperature and melting point of the material. In the FTIR spectrum, the band at 3413 cm⁻¹ represents axial deformation of the N–H bond; at 2926 cm⁻¹ and 2851 cm⁻¹, it corresponds to deformation of the C–H bonds of aliphatic groups. At 1640 cm⁻¹, it is attributed to the C=O bond of amides. At 1462 cm⁻¹, it is attributed to the stretching of the C=C bond in aromatic rings. The band at 1036 cm⁻¹ is related to the Si–O stretching.

CONCLUSION

This paper shows how to biosynthesize semiconductors. The product, characterized in physical chemistry, showed strong potential for application in the microelectronics

industry, highlighting the carbon and silicon content, aiming for application in miniaturized sheets and chips.

It is concluded that the validation for commercialization of the product sparks innovation in the industrial environment, is low-cost, and offers innovative solutions for the environmental recovery of ecosystems, producing semiconductors for electronics applications.