PÔSTER - SÍNTESE E CARACTERIZAÇÃO DE MATERIAIS

CARBON NANO SURFACES AND TUBULES APPLIED AS A GAS SENSOR

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The search for electronic materials that can fit into the organic and sustainable category is gaining more and more space. In this way, the organic electronics that we know today have been standing out and alternatives to existing technologies. Materials such as Carbon Nanotubes (CNT) have several applications and possibilities for processing in this field of technology, enabling several applications in the consumer market when well structured. The implementation of carbon-based materials can be used as smart coatings, flexible screens, high quality display panels, sensitive films or layers of a sensor device. Such materials, when arranged in the form of thin films, exhibit some structural advantages, such as good electrical conductivity, mechanical strength and high stability when exposed to the ambient climate. Faced with the various ways of processing carbon nanotube structures, it would be in the form of fines with one or more layers through Langmuir techniques, which allows organizing and controlling the monolayer of material on an aqueous subphase free of

impurities at controlled temperature, allowing an in situ stability analysis to determine the best transfer pressure for a solid substrate. Subsequently, using this carbon nanostructure as a sensor of organic or inorganic volatile organic vapors, in which these vapors can interact with the structural cavities of carbon nanotubes ordered as a thin film, as the structure formed is based on the organization of the tubes, we can obtain an area wide sensorial due to the formation of nanochannels or porous nanosurfaces that facilitate the contact with the vapor to be detected. In this work, single-walled carbon nanotube with functionalized side chain was used as material, thus enabling its solubilization in volatile organic solvents, making their processing in a Langmuir trough feasible. The organic solution was submitted to in situ analysis of the film still in the aqueous subphase using isotherms (p-A) during superficial compression of the material. Optical characterization was carried out to study the growth of the sensor layers, and electrical characterization of the thin film already under a solid substrate interdigitated with gold, analyzing this current by voltage (I vs V) to measure the electrical conductivity of each sample. Novice human vapors were applied to the NTC thin films to interact with the nanotubes in order to observe their potential as a gas sensor using current-time measurements (I vs t). The results obtained showed the potential of the materials as good electrical conductors, with the possibility of reproducing the devices as well as maintaining the conduction pattern. With the advantage of being organic, with a high contact area, it presents great environmental stability even after exposure to several cycles of vapors on the samples.