



DEPARTMENT OF SCIENCE & HUMANITIES

<b>Online Course Title</b>	International Faculty Development Program on Novel Materials for Energy and Biomedical (Covid-19) Healthcare Applications
<b>Faculty attended</b>	Dr. SU. Narmatha
<b>Learning Outcome</b>	To know how the various materials are useful for energy and biomedical health applications.
<b>Summary / Content of the programme</b>	<ul style="list-style-type: none"><li>➤ On the first day the speaker explained how cinnamon is added with gold nanoparticles by plasma plume method. Then he explained about the structure and morphology and optical properties of CNPs grown in different liquid media. Gold cinnamon nanocomposites were useful in biomedicine such as antibacterial, anticancer, antifungal and antidiabetic drug developments. Finally he concluded that Au-Ci ncps grown in ethanol shows high antibacterial activity.</li><li>➤ On the second the speaker explained about the main properties required for a bio material. A biomaterial is a substance that has been synthesized to interact with biological systems for a medical purpose - either a therapeutic (treat, augment, repair or replace a tissue function of the body) or a diagnostic one. Explained about the various types of natural and synthetic biomaterials using a variety of chemical methods using metallic components, polymers, ceramics or composite materials. Nano Biomaterials are used to detect disease and cure it. Also it can deliver drugs to diseased cells directly.</li><li>➤ On the third day the speaker explained the Photo functional materials for Dye sensitized solar cells. This DSSC converts solar energy to electrical energy. It is used in photo anode. Photo anode acts as a charge transport medium to collect electrons. Also he explained the preparation and its characteristics</li><li>➤ On the fourth day the speaker explained about the preparation of porous carbons from natural precursors. It is used as a material for energy storage, electronic device fabrication, DSSC, fuel cells and synthesis of natural products. He explained about the natural materials beetroot, garlic etc. is used as antioxidant, controls BP, skin problems, bone health etc.</li><li>➤ On the fifth day the speaker explained about Graphene. Graphene is a single layer (monolayer) of carbon atoms, tightly bound in a hexagonal honeycomb lattice. It is an allotrope of carbon in the form of a plane of sp<sup>2</sup>-bonded atoms with a molecular bond length of 0.142 nanometers. Layers of graphene stacked on top of each other form graphite, with an interplanar spacing of 0.335 nanometers. The separate layers of graphene</li></ul>

	<p>in graphite are held together by van der Waals forces, which can be overcome during exfoliation of graphene from graphite.</p> <ul style="list-style-type: none"> <li>➤ Graphene is the thinnest compound known to man at one atom thick, the lightest material known (with 1 square meter weighing around 0.77 milligrams), the strongest compound discovered (between 100-300 times stronger than steel with a tensile strength of 130 GPa and a Young's modulus of 1 TPa the best conductor of heat at room temperature. The grapheme materials are used for many biomedical applications such as catheters, artificial organs, valves, clips, screws etc. Biosensors are a sensing device used to determine the concentration of substances and other analysis of biological interest. Grapheme can be coated on electronic fiber for smart textiles.</li> <li>➤ On the sixth day the speaker explained about the nanomaterial's for catalytic applications. He explained how nanoparticles are grown by various methods like ball milling, chemical and Physical vapor deposition etc. Nanomaterial based catalysts are usually heterogeneous catalysts broken up into metal nanoparticles in order to enhance the catalytic process. Metal nanoparticles have high surface area, which can increase catalytic activity. Nanoparticle catalysts can be easily separated and recycled. He explained about functional nanomaterial which are the functionalization of nanoparticles means modification in surface characteristic by attaching surface by any other chemical entities.</li> <li>➤ The Fdp is very useful to understand about various biomaterials and its application</li> </ul>
<p><b>Suggestions / comments of Faculty</b></p>	<p>The content of PPT and clarity of speaker is good.</p>