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Production of carbon nanotubes (CNTs) from solid/mixed waste plastic

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A large quantity of the waste plastics produced around the globe is composed from HDPE, LDPE, PP, PS, PETE, PVC and others. For many years, researchers have been looking for solution in various ways to overcome the large quantity of the problems. However, carbon nanotubes (CNTs) are materials with extraordinary chemical and physical properties which have energy and resource-intensive production process. In recent years some researchers have suggested an idea of using waste plastics polymer to produce carbon nanotubes by using different methods such as catalytic and thermal methods in autoclaves, quartz tube reactor, muffle furnace, fluidized beds and other available methods. Still much work needs to be done regarding further investigation of the numerous parameters of nanotubes production yield, quality and quantities. The area of research and development of production of carbon nanotubes from waste plastics is still open for further and various research. It would be promising route for both waste reduction and energy consumption.

Biography

Moinuddin Sarker, PhD, MCIC, FICER, MInstP, has been working as the Vice President (VP) of Research and Development and Head of Science Team (VP and CTO), at the Natural State Research (NSR), Inc., at Stamford, CT and the inventor of NSR's award winning technology to convert municipal waste plastics into liquid hydrocarbon fuel. He has an MSc (1992) and PhD degree in Chemistry from University of Manchester Institute of Science and Technology (UMIST), Manchester, UK (1996). He has three patent pending and 100 research publications to his credit in peer reviewed journals and conferences. He is a distinguished member of 30 professional organizations such as American Association of Naval Engineer (ASNE), Association of Consumer Growth (ACG), Society of Automobile International (SAE), American Chemical Society (ACS), American Physical Society (APS), American Institute of Chemical Engineering (AIChE), International Union of Pure and Applied Chemistry (IUPAC), Canadian Society for Chemistry (CSC), Chemical Institute of Canada (CIC), Canada and many more. In 2010, he received, the International Renewable Energy Innovator of the year Awards 2010 at Washington DC and presented by Association of Energy Engineers (AEE), USA. Currently, he serves as a President of AEE-CT Chapter (Association of Energy Engineers, CT Chapter) since 2012.

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Tunable self-nanopatterned fluorescence proteins on metallic surfaces

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The diverse properties of natural materials have always been at the core of bio-inspired and biomimetic materials. However, there have been challenges in translating the design strategies used by Nature to the engineering of new materials. The way Nature evolves the biological systems serves to bring multiple functions that are built upon bio-molecular machinery. One of the unique features in this approach for engineers is probably their inherent ability to self-assemble over multiple length scales. Among different biomolecules, proteins play an important role in bio-molecular systems by performing diverse functions due to their specificity and their precise molecular recognition properties. In the last decade, there has been a growing interest in mimicking molecular scale interactions of biomolecules at the solid material interfaces to design novel materials and systems. Our group has been specifically interested in engineering peptides with materials selective affinity to inorganic materials. These peptides were then utilized in building up the bio-integrated systems through their self-organization on the surfaces. When genetically fused with other functional proteins, they may also direct the assembly of the resulting multifunctional biomolecule. Here we will demonstrate the addressable assembly of proteins on a variety of surfaces leading to self-organized hybrid systems that employ peptides as a genetically conjugated component. Our specific examples will include engineering of the fluorescence proteins to obtain a tunable quenching property through their self-organization on metallic nanosystems as a monitoring tool.

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