DNA type polymer for nanoelectronics

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Scientists and engineers often turn to nature for inspiration and clues on how to do things more efficiently and effectively. European researchers successfully induced self-assembly of a novel electrically conductive polymer with the double-helical structure of DNA.

Self-assembly, the process by which individual components put themselves together into a larger functional species, has been an area of interest for quite some time now.

Creating new electro-active polymers for potential use in nanoelectronics via subcomponent self-assembly was the goal of the EU-funded 'Metal-

containing functional polymers through subcomponent self-assembly' (Mecofupo) project. Researchers focused on using metal-ion templates to guide the self-formation of polymers via chemical bonding with the metal.

Successful development of a novel polymer with a copper (I) template that responded in a predictable way to stimuli such as light, heat and mechanical shear motivated researchers to search for more materials for use in electrochemical devices.

They pursued a double-helix structure reminiscent of self-assembled deoxyribonucleic acid (DNA) based on a copper (I) template as a potential molecular wire. This was done based on evidence that such a template exhibits electron delocalisation among copper ions.

The novel material was electro-active and demonstrated self-assembly both on a silicon surface relevant to potential electronic device applications and in solution. Collaborations were formed among three departments at the University of Cambridge to study the properties of this unprecedented material in detail.

Self-assembly of electrically conductive polymers responsive to external stimuli has important applications in tissue self-repair and regeneration as well as biological sensing. Such a polymer with the double-helical structure of DNA could open the door to a wide range of applications related to genetics and gene therapies.

Provided by CORDIS

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