Major hurdle cleared for organic solar cells

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Solar energy is an environmentally-friendly way of producing electricity and is considered to be one of the most appealing options for the future.

The basis for solar energy is absorbing light and then effectively disassociating electrical charges. As Yana Vaynzof, a University of Cambridge researcher, reports in the American Institute of Physics' Applied Physics Letters, conjugated polymers are excellent materials for such a system, thanks to their light absorption and conduction properties. Unfortunately, poor charge disassociation in these materials tends to inhibit their performance. Photo-induced charges remain closely bound and recombine before they can be collected for electricity.

With a goal of working around this, Vaynzof and colleagues studied the charge disassociation at an interface between an organic polymer, in which the light is absorbed, and an inorganic oxide layer.

"In particular, we discovered that modifying the interface with a self-assembled monolayer of molecules results in an increase of charge disassociation efficiency to nearly 100 percent," says Vaynzof. "Our measurements revealed that the molecular modification alters the energetic landscape of the interface so that the light absorbed in its vicinity is disassociated into charges that are then swept far from each other -- preventing them from recombination, much like two balls rolling away from each other on opposite sides of a hill."

This has significant implications for the organic solar cell industry because it offers an interesting solution to one of the field's most

significant problems.

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