Improvement of Organic Semiconductor Interfaces via the Diels-Alder Reaction

Ability to eliminate interfacial problems of organic semiconductors, including poor adhesion, thermal expansion mismatch, contact resistance, and metallization damage, through the use of well-defined and mild Diels-Alder reaction

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Field
Organic Materials
Semiconductor Materials
Materials science
Passivation
Adhesion

Technology
Diels-Alder vapor phase reaction generates new functional groups at the surface of organic semiconductor thin films or crystals. The change of the surface imparts improved interfacial properties to the material.

Key Features
- Improved adhesion of top contacts, protective layers, or sealants to the organic semiconductor surface.
- Reduced degradation of organic materials through surface layer changes
- Improved (ohmic) contact at the interface with source and drain.

Key Benefits
Patent allows a wide variety of functional groups to be appended to an organic surface with greater control over density, location, and other aspects.

Stage of Development
Chemistry demonstrated. Nature of layer determined. Mechanism understood. Modest optimization of conditions completed. Thermal stability studied. Improvement in adhesion examined

Status
Seeking research and development partners.

Patent Status
Full

Benefits

The invention exploits the potential for generating well-defined, regular and

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Dr. Jacob Ciszek's research is focused on the interplay between complex synthetic molecules and surface behaviors. He is particularly interested in modulating surface properties, specifically the work function of metals, applying cutting edge synthetic molecules to recently established surface phenomena, and the study of the interfaces between surfaces. His research into the work function of organic materials and semiconductors is targeted at developing more efficient electrical transport mechanisms that could impact applications such as creating more efficient organic light emitting diodes (OLED)(L) -. (e) 1 (m) -4-52 (e) Q q 0.2(i) 8 P (p