### 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**

**Advantage of Partnership**
Industrial adoption is a priority for the inventors and Loyola University Chicago. The inventors are available to assist in the process, via consulting or a research agreement. Most of the impediments and red tape associated with agreements at large research institutions are pleasantly missing at Loyola University Chicago.

**Opportunity**
Loyola University Chicago is looking for commercial research and development partners for this technology.
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Associate Professor
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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 (OLEDs). In addition, he is looking at how classical solution based chemistry can be applied to the surface of non-traditional surfaces such as organic semiconductor crystals and films. His group at Loyola University seeks to take advantage of synthetic chemistry's ability to modify these materials, to improve their performance in devices.