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# Melt-Processable Semiconducting Polymers

**A new class of melt-processable semiconducting polymers with enhanced solubility enables low-cost, environmentally friendly manufacturing of plastic electronics using less toxic solvents.**

Semiconducting polymers (conjugated polymers) are promising optoelectronic materials for next generation flexible and printed electronics, including organic solar cells, field-effect transistors, light-emitting diodes, and electrochromic devices. These polymers are typically processed using organic solvents; however, many high performance conjugated polymers encounter the solubility problem. This leads the polymers to be processed in chlorinated solvents under high temperatures.

Researchers at Purdue University have developed a new class of polymers that exhibit enhanced solution processability and are designed to enable melt-processing. This opens the possibility for fabrication of plastic electronics via extrusion and lamination processes. This was accomplished by introducing torsion-susceptible linkages along the polymer backbone, which led to dramatic improvements in solubility for polymers. The linkages also assisted in making solution processing possible under ambient conditions using less toxic solvents. Melt-processable semiconducting polymers allow for a more environmentally friendly process at a low cost.

**Advantages**:

-Improved solubility and processability of high-performance semiconducting polymers

-Solution processing possible with less toxic solvents

-Reduces the manufacturing cost and environmental impact

Potential Applications:

-Electronics Industry

**TRL:** 4

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**Category**
Chemicals & Advanced Materials/Polymer Science & Smart Materials
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Semiconductors/Semiconductor Materials & Substrates

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