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# Scalable Manufacturing of 2D Coordination Polymer Films

### Background

Two dimensional (2D) polymers are relatively new types of organic materials with remarkable electronic and structural properties, making them attractive for a variety of applications. Unlike traditional polymers, monomer building units are arranged in a sheet-like manner to form 2D networks of 2D polymeric materials. This opens a wide range of new applications for polymers in the nanoelectronics, photonics, and biomedical fields. However, efficient high-volume production of 2D polymers has not been successfully established. Isolation of single-layer polymers, ability to achieve large, defect-free areas, and control over crystallinity and thickness remain critical challenges for 2D polymer production.

### Invention Description

Researchers at Arizona State University have developed an innovative system for scalable and cost-effective manufacturing of 2D polymers. Synthesis of a variety of 2D polymeric materials is achieved using a two-phase technique coupled with a roll-to-roll mechanism for collecting 2D polymeric sheets at a controlled rate. Polymer thickness, crystallinity, and structure can be controlled through adjustment of various manufacturing parameters.

### Potential Applications

- Nanoelectronics
- Photonics
- Catalysis
- Porous membranes

### Benefits and Advantages

- Innovative – Enables cost-effective, large-scale deposition of 2D polymers onto flexible substrates, currently unachievable with existing techniques
- Scalable – Design emphasizes industrial compatibility and potential for large-scale manufacturing of 2D polymers

- Tunable - Allows close control of the thickness, crystallinity and structure of produced 2D polymers

[Laboratory Homepage of Professor Sefaattin Tongay](#)

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