

## Directed Assembly of Polymer Structures for High-rate Nanomanufacturing

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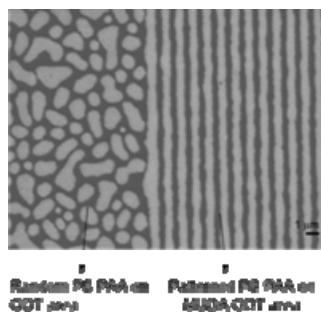
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### Presentation

**Short Description:** CHN has developed a suite of templates and assembly processes for directing the assembly of a variety of nanoelements. These assembly processes utilize both electric fields and/or chemical functionalization. Chemically functionalized templates have been used to direct the assembly of polymer blends in a one step process. Electric fields have been used to direct the assembly of conducting polymers, which can be transferred to a secondary substrate producing flexible patterned polymer structures.

**Keywords:** Nanomanufacturing, templates, directed assembly, transfer, polymer blends

**Abstract:** CHN has developed a suite of templates and assembly processes for directing the assembly of a variety of nanoelements. These assembly processes utilize both electric fields and/or chemical functionalization. Chemically functionalized templates have been used to direct the assembly of polymer blends into uniform and nonuniform patterns. The selective assembly process can be finished in 30 seconds directly from a solution of the two polymers. The approach can be used to generate a variety of complex geometries including 90o bends, T-junctions, square and circle arrays, which have potential applications in fabrication of integrated circuits in nanoelectronics. Electrophoretic assembly processes have been used to assemble conducting polymers followed by transfer to a secondary substrate to produce patterned polymer structures. The transfer of both conducting polymers and carbon nanotubes to a polymer substrate in the melt state using both compression molding and the thermoforming process will be discussed. Patterns have been successfully transferred in times under a minute. The entire process of patterning and transfer takes less than five minutes, which is commercially relevant and can be utilized for real time processing.



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