

## **High Throughput Combinatorial Studies of Thermoelectric Materials**

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At the National Institute of Standards and Technology (NIST), we have developed a combinatorial film deposition facility and a suite of high throughput instrumentation to perform combinatorial characterization to identify higher efficiency thermoelectric materials. These capabilities include a Pulsed Laser Deposition (PLD) apparatus for combinatorial thin film synthesis, an X-ray diffractometer for phase characterization, and a suite of tools for screening functional properties such as the Seebeck coefficient, electrical resistance, and thermal effusivity of combinatorial films. The Seebeck coefficient and resistance are measured via custom-built automated apparatus at and above room temperatures. Thermal effusivity is measured using a frequency domain thermoreflectance technique. Our talk will discuss the applications using these tools to investigate thermoelectric materials, including combinatorial composition-spread films of various systems, and also conventional films, single crystals and other bulk materials.