

Graphene Flakes Take the Heat

NSF Award: [NSF Industry/University Cooperative Research Center on Compact, High-Performance Cooling Technologies Research](#) (Purdue University)

State: [Indiana](#)

Congressional Districts: Indiana District 04

Research Areas: [Engineering](#)

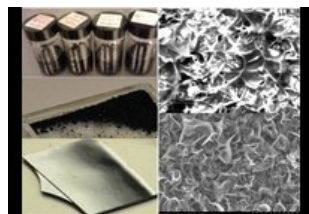
To improve cooling of electronic components, researchers at the Center on Compact, High-Performance Cooling Technologies Research, led by Purdue University, investigated graphene-based thermal interface materials (TIMs). They found that as the amount of graphene increases in a graphene composite, the material's ability to conduct heat increases significantly.

Efficient heat dissipation is critical to maintaining performance and reliability in many applications such as integrated electronic circuits. Gaps or voids between heat transfer surfaces, for example, between a computer processor and heat sinks, are unavoidable. However, conductive materials such as TIMs can fill the gaps and enhance heat dissipation.

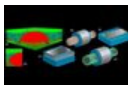
Graphene, a single atomic layer of graphite with a honeycomb lattice structure, exhibits very high thermal conductivity, making it an outstanding candidate for TIM applications. This project investigated the use of graphene flakes as TIMs. Graphene flakes can either be grown vertically on substrates by plasma enhanced chemical vapor deposition or chemically reduced from graphite oxide. A mixture of commercial thermal paste or polymer with graphene flakes is another graphene-based TIM option.

Graphene-based TIMs, especially vertically grown graphene petals, exhibit better performance than commercially available TIMs and could enable completely new products and applications.

Image



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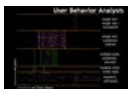


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