

**Name of project:** Nanocomposites with exfoliated graphene nanoplatelets

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Please provide a description of your project:

Monolayer or few-layer graphene materials exhibit extremely high thermal and electrical conductivities. However, the current commercially available graphene materials, e.g., graphene nanoplatelets (GnPs), typically have multiple layer structures (tens to hundreds of layers) and their properties are inferior as compared to the graphene with only a few layers (typically below 10 layers). In this laboratory, we have shown that supercritical fluid (CO<sub>2</sub>, N<sub>2</sub>, etc.) treatment can effectively exfoliate commercially available and low-cost GnPs. The process involves supercritical fluid penetration inside GnPs followed by quickly decreasing the pressure so that the graphene layers can be delaminated by gas expansion. The composite materials with the exfoliated GnPs are expected to exhibit enhanced electrical, mechanical and thermal properties. The intern will work on the preparation of the exfoliated GnP nanocomposites and foams and examine the electrical/thermal conductivity for functional applications, such as static dissipation, electromagnetic shielding, energy storage and thermal management.

Who should apply for this project- MEC, IND, both? Both