

Team name : Team NAECO

Title/Contest : Conductivity-Enhanced Nanocarbon Copper Composites /“Beat Copper Contest”

Target Initial Markets: Aerospace (\$14 Billion), Transportation (\$25 Billion)

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**Description of Materials:** Team NAECO will provide proprietary alloy pre-materials to PNNL, packaged in a patent-pending billet, for conversion into testable samples of enhanced-conductive materials. Our first two Materials will be Copper with very low quantities of additives, called dopants. Then Graphene will be added to create a new class of enhanced-conductive Metal-Graphene composite materials.

**Abstract/Fabrication Approach:** (Material Class: *Metal Enhanced with Nano-Carbon*):

We will start with Copper alloys having special additives, then send our pre-material on to PNNL for their ShAPE™ process, thereby making a new class of Copper Alloy/Graphene nano-composites. Next, we will test and validate in downstream fabrication processes. With DOE collaboration, we will validate measurements of conductivity and other physical/mechanical properties.

In our final steps, we will collaborate with our customers/end users to produce samples that can ultimately be functionally tested - with real-world performance results measured against our existing commercial products made from standard materials.

**Potential Impact:** NAECO is present in the Aerospace, Electric Vehicles, Industrial and Rail markets. Deploying an enhanced conductive material into these markets has the potential to support transformational technology for power distribution devices/systems that impact our daily lives. More efficient conductivity of electricity and heat means savings in costs, greater scalability and the possibility for reduced greenhouse gas emissions. For our proposed Copper Alloy-based composites, we think the approach could improve electrical conductivity up to 12% over the benchmark, e.g. 65 MS/m or higher.

