Project Title

**Development of a Novel Passive Cooling System for High Energy Density Batteries**

Supervisor(s) Name(s) and Department affiliation

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Abstract

The goal of this project is to develop a unique passive thermal management system for advanced batteries used for hybrid and electric vehicles. Current active cooling system includes liquid or air cooling that requires significant energy for fluid flow and adds excess weight, noise, and cost. The passive system works based on latent heat of phase change materials, and it doesn’t require any moving parts.

In this project, we will develop a novel nano composite that serves as heat absorber and a medium for rapid heat conduction. The novel phase change materials with high latent heat will be embedded in a selectively oriented fiber network with very high heat conduction. The total heat generation in battery due to Joule heating and entropic reaction heat will be simulated. Optimum cooling plates will be designed to meet the requirement of battery temperature range, and the simulated results will be validated with experimental data.

Number of students and background and/or pre-requisites required

2-3 students motivated to work on electrification of vehicles, Students with strong background in modeling-simulation, are required.

Resources Required

Access to COMSOL software package, Battery Tester (battery cycler), Lab space with hood

Budget Required

$500 internal and support from industry (project based)