KONGU ENGIEERING COLLEGE

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TEAM ID: **TEAM NAME:** TEAM BTMS **PROJECT CATEGORY:** SMART VEHICLES **PROBLEM STATEMENT ID:** SIH1477 **PROJECT TITLE:** BATTERY THERMAL MANAGEMENT SYSTEM **DEPARTMENT:** AUTOMOBILE	**TEAM LEADER:** ADHITYA L S **TEAM MEMBERS:** SANTHOSH SINGH R KARTHIK S ARUVI B ARAVINDH R MONIGA B **MENTOR:** Dr. P. C. MURUGAN

Abstract:

The thermal management of batteries is a crucial aspect to improve their performance, lifespan, and safety. In this research, the proposed method of battery thermal management system(BTMS) is heat pipe integrated immersion cooling to control battery temperature and maintain the uniform temperature over the entire battery pack.In Analysis the performance and heat transfer characteristics of the heat pipe in an immersion cooling system by simulating it under actual operating conditions. A heat pipe thermal management system was employed in many applications but it is not so successful in BTMS due to the lack of experimentation. But in this system, it is proposed to use the heat pipe with a dielectric fluid medium in a lithium-ion battery pack which can able to absorb the heat from the battery cells and dissipates to the environment through the condenser section of a heat pipe at a higher rate. The modified design of the heat pipe condenser section and using acetone and acetone with Al2O3 and CuO nanofluids with different filling ratios in a heat pipe can able to control the temperature of the battery even under high charging and discharging conditions. An Peltier Cooling system was implemented along with the BTMS to rapidly dissipate the heat from the condenser section during the high “C” values. Analytical results from the previous research suggest that the integrated system has better thermal stability but only limited experimental studies are done in the BTMS. The proposed hybrid thermal management system offers optimal thermal management in batteries and maintains thermal stability with extended battery life and performance. In conclusion, the proposed battery thermal management system can be utilized in many applications requiring high energy density and power density. Both heat pipes and immersed cooling systems offer practical and efficient thermal management solutions for lithium-ion batteries.