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Battery Temprature Control with Temprature Monitoring System

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Abstract- Now-a-days electrical vehicles play major important role compares to conventional vehicles. We need to take care of batteries in the vehicles. So, we did the survey for battery management system. We found number of ways to manage battery temperature. But we also found some drawbacks in those systems. We will try to work for those drawbacks and to overcome that drawback in our future work.

LITERATURE REVIEW

Furen Zhang, Shiyuan Li in may 5, 2022 has Proposed system infront of us that to simplify the battery pack structure and to avoid problems such as poor heat dissipation caused by uneven liquefaction of change materials to improve the performance of battery pack and control its maximum temperature and also use to control its maximum temperature difference in this system the liquid cooling is used to reduced the temperature of battery packs. In order to enhance the heat dissipation performance of battery packs without consumption of energy the new method is proposed addingof fins liquid cooling channel. The fins on liquid cooling channel could improve the temperature uniformity of battery packs and reduced the maximum temperature of battery packs .When the influence of coolant flow on battery packs the temperature was analyzed and when increase of coolant flow rate the maximum temperature of battery packs decreases.

Mohammad Ali Abdelkareem, Hussein M. Maghrabie, Ahmed G. Abo-Khalil A.G.Olabi in july, 2022 has proposed a system infront of us that the lithium ion batteries used in hybrid vehicles and electric vehicles generate excessive heat during fast charging and discharging. So this system is used to provide low power consumption, efficient heat transfer, cheapest and lightest solution like phase change materials and heat pipes are essentials the efficient solution for TMS for batteries is heat pipe technology and it is important to explore the possibility of combining heat pipes with conventional cooling system . In this system the utilization of TMS for batteries in electric and hybrid vehicles based on heat pipes combined with nanofluid and phase change materials. By using heat pipes for thermal management system in battery of electric vehicle and hybrid vehicle is proposed to reduce temperature of battery. The temperature can be distribute uniformly by using heat pipes with phase change material as well as using nanofluids

Hao-dong Wang, Qing Gao in December 2021 has proposed a system infront of us that there is rapid development in electric vehicles because of that the thermal safety of power batteries has received much attention. This system is manifold-based thermal management system that sprays regrigerant on to the surface of overheated batteries to prevent the occurance of thermal runway. The manifold has very good cooling capacity for emergency thermal management needs for overheated batteries. By decreasing the spray duty cycle can improve the heat transfer efficiency of the system and mitigate the cold shock to overheated batteries during spray cooling. Additionally cooling capacity of the system increases about 12% as the spray frequency increases from 0.33Hz to 2Hz, but because of that the temperature uniformity of the battery module gets weakened during spray cooling.

Shi Jin, Qing Gao, Xue Gao, Yuan gao, Tianshi Zhang in april 4, 2022 has proposed a system infront of us that the dual flow management system is more economical than refrigerant cooling. The refrigerant can be effectively cool the battery by evaporating with poor economy. The dual flow management system contains two methods of battery cooling: evaporative cooling by the refrigerant and convective cooling by the coolant called glycol solution The results show the lower

compressor speed, superheat, and external temperature can obtain a higher economy. The power consumption of the dual flow management system can be saved by 36.51% compared to the BTMS that uses only refrigerant to cool the battery. Finally, how to allocate the heat transfer area of the battery pack bottom to refrigerant tubes and coolant tubes is studied. The proposal of the dual flow management system provide a new idea for the design of battery thermal management system.

P. Aswin Sevugan, M. Pradeep, Abhishek Krishnaswamy, K Karunamurthy in November 19, 2021 has proposed a system infront of us that the electric vehicle has low emissions and noise pollution are the most suitable alternatives for conventional vehicles. Lithium-ion batteries which are widely used in Electric Vehicles are meant to operate within a temperature range of 20 °C–50 °C Battery Thermal Management Systems plays a vital role in maintaining this temperature range, improving service life and safety of the battery. There are two categories of Battery Thermal Management Systems namely active cooling and passive cooling. Owing to the drawbacks such as power consumption and design complexities involved in active cooling, passive cooling techniques increasingly gaining popularity. Passive cooling using Phase Change Materials are excellent candidates for Battery thermal management system. Phase Change Materials have high heat and can absorb a large quantity of heat generated from the battery, with minimal change in temperature. Two Phase Change Materials were chosen based on their properties such as melting temperature, specific heat, latent heat, Density., Thermal Conductivity, Dynamic Viscosity. While excess usage of phase change material will add to the battery's weight and also lead to ineffective use of phase change material,

using insufficient amount of phase change material might lead to uncontrolled rise in cell temperature.

Haitao Wang, Tao Tao, Jun Xu, Hu Shi, Xuesong Mei, Piao Gou in December 20, 2021 has proposed a system infront of us that in order to solve problems of high temperature rise and large temperature difference of the battery pack, novel liquid-immersed battery thermal management system is design for lithium-ion pouch batteries with compact structure and excellent heat

dissipation performance was designed. High insulation transformer oil was employed as the immersion coolant, and the system could operate in both active and passive modes. The experimental platform consisting of five 10Ah lithium-ion pouch batteries connected in parallel was constructed to investigate the cooling performance of liquid-immersed battery thermal management system. The results demonstrated that by liquid-immersed cooling the maximum temperature decreased from 58.3 °C to 39.4 °C, which fell by 32.4% and the maximum temperature difference of the battery module decreased from 4.97 °C to 1.23 °C with a decrease of 75.3%, the cooling performance of battery thermal management system was greatly improved. This system is more efficient to control the temperature and temperature difference of lithium-ion batteries.

Review

This survey is completely based on battery temperature control. Now-a-days electrical vehicles major important role compare to conventional vehicles. Battery plays an important role in electrical vehicles. The main battery life is depends on its temperature as the battery gets heated its life is reduced and performance is also become less and vice versa. To improve the battery life and its performance battery cooling system is important. In these papers various methods of battery cooling are explained. In most of the papers liquid cooling is preferred , but due to liquid cooling short circuit happens in electrical vehicles if precautions should not taken in well manner, and liquid cooling is somewhat costly. In some survey it seems that heat pipes, nano fluid and phase change material also used to reduce battery temperature, but by using integrated heat pipes with phase change material as well as using nano fluid the further enhancement of temperature distribution can be achieved. To overcome this drawback, we can use latest microcontroller which have a inbuilt Wi-Fi model. Along with that where using DST 11 sensor to will give temperature and humidity output to the microcontroller continuously monitor the battery temperature and

humidity and according to that we are taking the decision if the battery temperature is beyond the range we will automatically turn on the cooling system fan to decrease the battery temperature and heat the exhaust fan is attached to the relays when exhaust fan is turn on and decrease the temperature if the temperature is within range automatically turn off This system will be employed in our proposed work.