

Analisis kinerja pipa kalor melingkar pelat datar sebagai sistem manajemen termal baterai litium - ion pada kendaraan listrik =
Performance analysis of flat plate loop heat pipe as thermal management system for lithium - ion battery in electric vehicle

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Abstrak

[Peningkatan temperatur baterai litium-ion pada kendaraan listrik dapat mengakibatkan berkurangnya kapasitas dan jumlah siklus kerja sebuah baterai litium-ion. Bahkan, sel baterai dapat mengalami thermal runaway yang berakibat baterai litium-ion dapat terbakar dan meledak. Salah satu jenis alat penukar kalor yang bisa digunakan sebagai sistem manajemen termal pada baterai litium-ion adalah pipa kalor melingkar pelat datar. Penelitian ini dilakukan untuk menguji kinerja pipa kalor melingkar pelat datar dan mencari nilai hambatan termal yang dihasilkan dengan variasi fluida kerja akuades, alkohol, dan aseton dengan filling ratio sebesar 60%. Dari hasil penelitian ini, aseton merupakan fluida kerja terbaik yang menghasilkan hambatan termal sebesar 0,22 Watt/°C dan temperatur evaporator sebesar 49,89°C pada beban fluks kalor sebesar 1,61 Watt/cm².;The increasing temperature of lithium-ion battery used in electric vehicle can cause major thermal runaway that can result in battery fire and explosion. One of the heat exchanger that can be used as thermal management system for lithium-ion battery of electric vehicle is Flat Plate Loop Heat Pipe. This research was conducted to test the performance of flat plate loop heat pipe and to determine the thermal resistance of flat plate loop heat pipe that used aquades, alcohol, and acetone as working fluid with 60% of filling ratio. The result showed that acetone is the best working fluid from among of the two other working fluids and had a heat pipe thermal resistance 0.22 Watt/°C with evaporator temperature was 49.89°C under maximum heat flux load of 1.61 Watt/cm²., The increasing temperature of lithium-ion battery used in electric vehicle can cause major thermal runaway that can result in battery fire and explosion. One of the heat exchanger that can be used as thermal management system for lithium-ion battery of electric vehicle is Flat Plate Loop Heat Pipe. This research was conducted to test the performance of flat plate loop heat pipe and to determine the thermal resistance of flat plate loop heat pipe that used aquades, alcohol, and acetone as working fluid with 60% of filling ratio. The result showed that acetone is the best working fluid from among of the two other working fluids and had a heat pipe thermal resistance 0.22 Watt/°C with evaporator temperature was 49.89°C under maximum heat flux load of 1.61 Watt/cm².]