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Experimental Analysis and Simulation of Electric Vehicle using Lithium-ion Battery

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Abstract: *Electric mobility is getting attention all over the world due to the increasing environmental concerns. Day-to-day use of fuel is increasing due to its consumption by the vehicles and other industrial uses. This massive use of fuel has given rise to the fuel prices. Also, India features among the top four nations using the greatest number of two-wheelers all over the world. Maharashtra is using the greatest number of cars in India. Delhi, Mumbai is the top among using two-wheelers in India. This shows the massive utilization of vehicles which results in high consumption of conventional fuels which are decreasing day by day. All these facts are contributing in increasing air pollution. Nearly 25% to 30% of total green-house gases emissions in world are due to transportation industry. This fuel consumption results in production of harmful gases like C02, NO2, NO and CO which causes environmental damage and has adverse effect on human health. To avoid these emissions electric vehicles were introduced. Electric vehicles can be powered by electric motors. As it runs on electricity, vehicle emits no exhaust gases and is environmentally friendly. EV employs electric-drive technologies to boast vehicle efficiency. The different types of batteries such as Lead acid, lithium ion, nickel bromide is used as an energy storage for electric vehicles. Lithium batteries are used as a mode in EV as they have higher densities than lead-acid batteries. Compared with other commonly rechargeable batteries like Ni-Cd, Ni-MH and Lead-acid battery, the lithium-ion battery is featured by high energy and power density, long service life and environmental friendliness and, thus, has been widely applied in consumer electronics It is a type of rechargeable battery in which lithium ions move from the negative electrode through an electrolyte to the positive electrode during discharge, and back when charging. Li-ion batteries use an intercalated lithium compound as the material at the positive electrode and typically graphite at the negative electrode. The present work is focused on the analysis of lithium-ion batteries with DC motor in an electrical vehicle using simulations and a scale model to compare and check different parameters like the state of charge of the battery, voltage, current, average speed of the vehicle, etc.*

Keywords: E-mobility, Types of Batteries, Lithium-ion Battery, Average Speed, Simulation, etc.

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