

## Material Mechanical Property for Improving the Energy Density of Lithium-Ion Battery

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**Abstract :** The energy density of various battery technologies used in the electric vehicle industry still ranges between 250 Wh/kg to 650 Wh/kg, thus limiting their distance range compared to the conventional internal combustion engine vehicle. In order to overcome this limitation, a new material technology is necessary to overcome this limitation. The proposed sole lithium-air battery seems to be far behind in terms of practical implementation. In this paper, experimental analysis using COMSOL multiphysics has been conducted to predict the performance of lithium ion battery with variation in the elastic property of five different cathode materials including; LiMn<sub>2</sub>O<sub>4</sub>, LiFePO<sub>4</sub>, LiCoO<sub>2</sub>, LiV<sub>6</sub>O<sub>13</sub>, and LiTiS<sub>2</sub>. Combining LiCoO<sub>2</sub> and aqueous lithium showed great improvement in the energy density. Thus, the material combination of LiCoO<sub>2</sub>/aqueous lithium-air could give a practical solution in achieving high energy density for application in the electric vehicle industry.

**Keywords :** battery energy, energy density, lithium-ion, mechanical property

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