Graphene Li-Ion Battery –
How it will shape the Electrical Vehicles of tomorrow

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Abstract (Arial 10)
Lithium-ion batteries make a significant contribution to green transportation, including electric vehicles, hybrid vehicles, and plug-in hybrid vehicles, because of their outstanding performance [1–3]. The high price of lithium-ion batteries is one of limitations for their widely application. In order to reduce the economic costs of lithium-ion batteries, it is critical to improve the battery performance and cycle life, which are mostly affected by many factors such as operation temperature, current and battery configuration. The use of graphene and graphene oxide for both anode and cathode materials can increase the battery capacity and lifespan of a battery. We will present the potential of graphene battery and its impact on electrical vehicles of the future.

References

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Figures

Performance Comparison (6.5AH/25AH/40AH Cells)

Type	Graphene Battery	Lithium-Ion Battery	LiFePO4
Energy Density (Wh/kg)	240~372	110~140	115~155
Life Cycle	10 Year (>2000)	500~1000	>1500
Battery and Supercap properties	Yes	No	No
Charging time	15~30min	1.5hrs	0.5~1hr
Fast Charging	1C~6C	0.5~1C	1~3C
Self Discharging (/Month)	1.00%	<5~13%	<5~8%
Over charge/discharging control	Passing electric	No	No
Safety (Explosion/Fire)	Excellent	Poor record	(low heat)
Capacity (mAh/g)	900	150	160
EOA	(ROHS)	Green	Green
Power Density (w/kg@30secs)	2000	664	1000
Instantaneous Output current	40C	0.5~3C	5C~30C
Depth of Discharging (efficiency)	>99.00%	90.00%	>95.00%
Cost (US$/Kwh)		300	1000
Internal Resistance	<2mΩ	>20mΩ	>2mΩ
Stable Voltage	91.7%	85.00%	Balance (85%)
Standard Voltage	3.7	3.7	3.2
Volumetric Energy Density (Wh/L)	600	250	255