

Million-mile battery unveiled by ground-breaking research

September 27 2019, by Simon Davies



Credit: Institute of Physics

Elon Musk promised—and Jeff Dahn delivered. With the publishing of a ground-breaking paper in the *Journal of The Electrochemical Society* (*JES*), Dahn announced to the world that Tesla may soon have a battery that makes their robot taxis and long-haul electric trucks viable.

Dahn and his research group are Tesla's battery research partner. Dahn

said: "Cells of this type should be able to power an electric vehicle for over one million miles and last at least two decades in grid energy storage."

According to Doron Aurbach, JES batteries and energy storage technical editor: "This comprehensive article is expected to be impactful in the field of batteries and energy storage. It is a very systematic study by one of the most renowned and prestigious electrochemistry groups in the world. It was a pleasure for me as a technical editor to handle this paper. It substantiates all the statements about the truly high quality and importance of JES, one of the leading and most prestigious journals in electrochemistry.

"JES provides an excellent service to the global electrochemistry community—and thousands of ECS members—regardless of 'impact factors.'"

As of today, Dahn's JES article has received over 31,563 abstract views, over 17,000 articles downloads, and quotes in news outlets around the world.

In the article, Dahn and his research team provide full details of the new cell to create a benchmark for further research. They used a cathode material from the family of Ni rich NCM cathode materials. It has a specific capacity which is 20 percent higher than that of the cathodes used in Li-ion batteries that power today's mobile electronic devices.

The [cathode material](#) chosen, NCM 523 (50 percent Nickel, 20 percent Cobalt, 30 percent Manganese), is stable and an excellent reference and starting point for further developments. Other key components explored were graphite anodes and blends of solvents, additives, and salt for the electrolyte solutions.

Aurbach said the batteries described in the paper can be used for electric vehicles right away. "However, since the goal of the study was to provide a reliable benchmark and reference for Li-ion battery technology, the specific energy density of the batteries described is not the highest compared to what can be really reached by advanced Li-ion batteries. Based on the study, Li-ion batteries will soon be developed that make driving over 500 kilometers (over 300 miles) from charge to charge possible."

Expect more pioneering research announcements from Tesla and ECS member, Jeff Dahn, soon.

More information: Jessie E. Harlow et al. A Wide Range of Testing Results on an Excellent Lithium-Ion Cell Chemistry to be used as Benchmarks for New Battery Technologies, *Journal of The Electrochemical Society* (2019). [DOI: 10.1149/2.0981913jes](https://doi.org/10.1149/2.0981913jes)

Provided by Institute of Physics

Citation: Million-mile battery unveiled by ground-breaking research (2019, September 27) retrieved 9 April 2024 from

<https://techxplore.com/news/2019-09-million-mile-battery-unveiled-ground-breaking.html>

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