

# **A breakthrough in longer lasting lithium-ion cathode materials brings 'the million mile battery' dream closer to reality**

The biggest new trend in the electric vehicle (EV) and battery industry right now is 'the million mile battery'. The significance for the industry is huge. Imagine owning an electric car that can last for one million miles, or 1.6 million kilometers. This is a lifespan several fold longer than what current cars can offer. Owners will no longer need to worry about replacing their EV battery after 8-10 years.

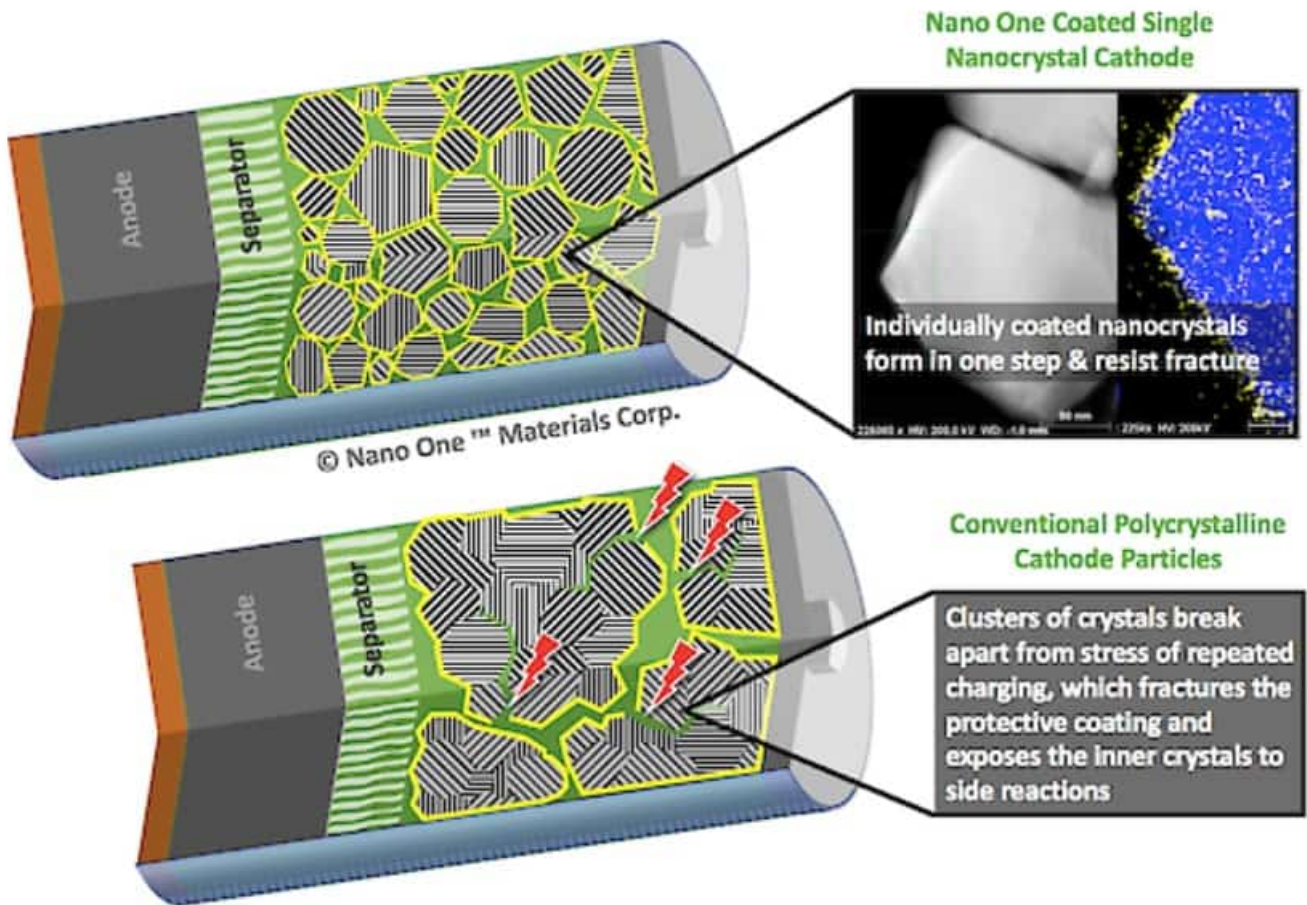
Even bigger is that fleet owners can own just one EV and run it for over 1 million miles. The taxi and trucking industry will be lining up for million mile EVs as it would be economic suicide not to own one. The EV industry is set to celebrate the breakthrough of longer lasting more durable cathodes that lead to better batteries capable of fast charging and a million miles lifetime

Nano One Materials Corp. (TSXV: NNO) (NNOMF) has just announced a breakthrough in 'longer lasting' lithium-ion cathode materials. The Company has developed a coated single nanocrystal cathode material which provides protection against undesirable side reactions and the stresses of repeated charge and discharge cycling.

Nano One's patented One-Pot process combines all input components – lithium, metals, additives and coatings – in a single reaction to produce a precursor that, when dried and fired, forms quickly into a single crystal cathode material

simultaneously with its protective coating.

## Nano One's patented method to produce a single crystal cathode material with a protective coating



Source

Dr. Stephen Campbell, Chief Technology Officer of Nano One Materials Corp. stated:

“We are focused on optimizing this for NMC811 and I am pleased to present recent results that show how protective coatings on a robust crystal structure can make cathode powders more durable and longer lasting. **Increased durability is critical in enabling extended range, faster charging and even million mile batteries for electric vehicles.....**By forming protective coatings on individual nanocrystals, Nano One eliminates process steps and is engineering new materials with enhanced durability for various applications including electric

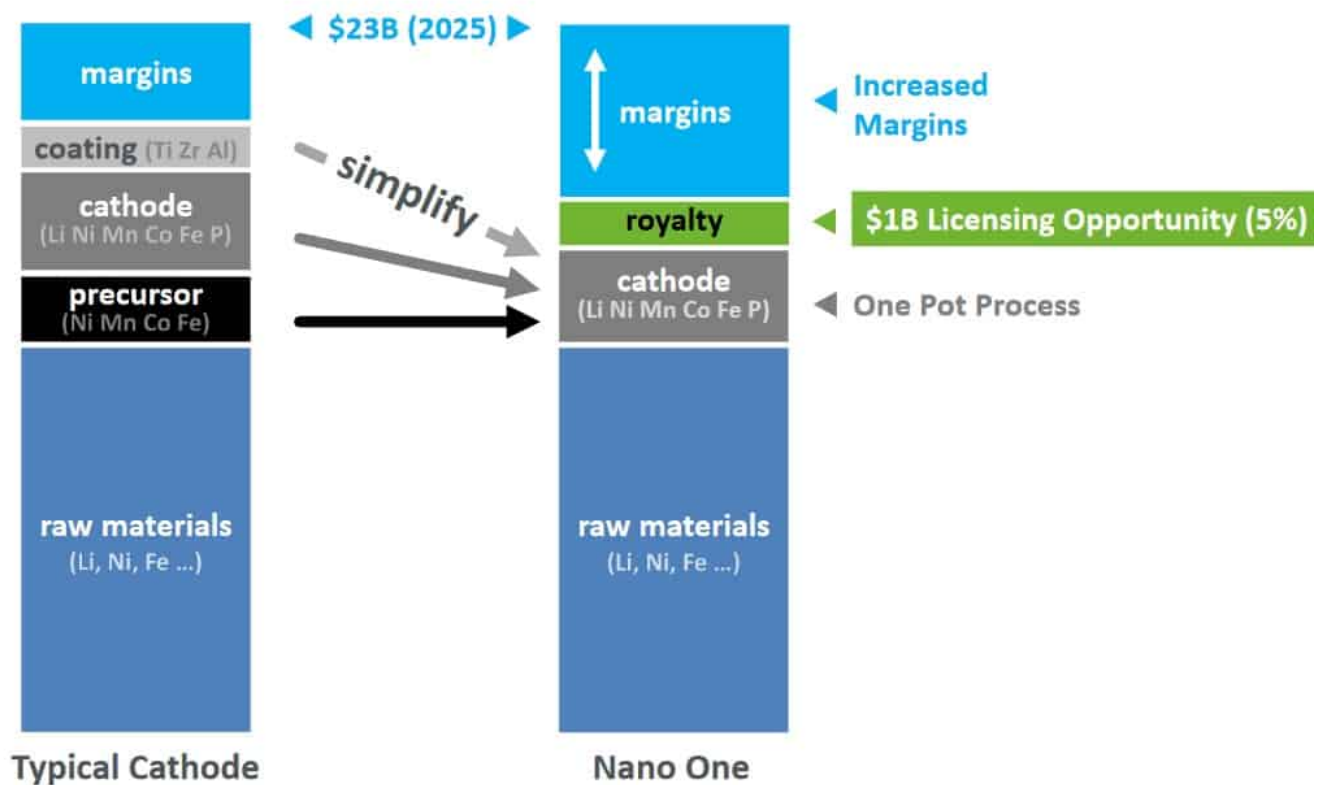
vehicles. These are positive results and we are optimizing the materials for third party evaluation on the path to commercializing this technology.”

The issues of range, charging times, and battery longevity are all critical to electric vehicles. This highly significant breakthrough, along with others, will lead to longer range, fast charging with less damage, and million mile batteries for EVs. The technology is really game changing in so many ways and should help pave the way for wider spread adoption of EVs in future years, especially for fleet operators such as taxis, buses, trucks, and other EVs that require heavy use.

Nano One is already very well partnered into the EV/battery supply chain via partnerships with industry giants such as Volkswagen, Pulead, Saint-Gobain and other undisclosed global automotive interests. Added to this recent raisings and government support means Nano One has about \$16 million of cash to further their patents, research and business plans & co-development activities.

**Cathode manufacturers can enjoy increased margins even after paying Nano One a royalty**

# \$1B Licensing Opportunity



Source

## Closing remarks

Nano One is leading the cathode industry with innovative and critical technological breakthroughs to make batteries better. The battery cathode market is forecast to be worth \$23 billion in revenues by 2025, and Nano One's goal is to achieve up to \$1 billion in licensing fees revenue for their patented cathode technologies. Given their progress so far that is looking like a highly achievable goal.

Nano One also works on the development of processing technology for the production of nano-structured materials. The Company is focused on building a portfolio of intellectual property and technology know-how for applications in markets that include energy storage, specialty ceramics, pharmaceutical, semiconductors, aerospace, dental, catalysts, and communications.

On a current market cap of only C\$110 million it is not too late for investors to get onboard. These are truly very exciting times for Nano One, and for the EV/battery industry as a whole. The big winner will also be the consumers of fast charging EVs with batteries that can charge faster and last a million miles or more. I can't wait to buy one myself.

[Publisher's Note: Special thanks for the rights to publish the above artwork from Brendon Grunewald of the Polar Conservation Organisation]

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## **Nano One's Stephen Campbell on making better lithium ion battery material**

March 19, 2018 – “As the market expands drastically for battery electric vehicles there is a potential for looking at that technology again and we have a new process that we believe is much better, much more efficient and makes better material,” states Dr. Stephen Campbell, Principal Scientist for Nano One Materials Corp. (TSXV: NNO), in an interview with InvestorIntel's Peter Clausi.

**Peter Clausi:** Principal scientist implies a PhD. What is your doctorate in?

**Stephen Campbell:** It is in electrochemistry, semiconductor electrochemistry and fuel cells and batteries.

**Peter Clausi:** How long have you been in the field?

**Stephen Campbell:** 35 years.

**Peter Clausi:** And still learning every day.

**Stephen Campbell:** Always. Every day there is something new.

**Peter Clausi:** As principal scientist you guide a team of researchers at Nano One.

**Stephen Campbell:** I have a very great team of people in Nano One. They do great things.

**Peter Clausi:** How many people are on the team?

**Stephen Campbell:** 10 or 12 people.

**Peter Clausi:** What is the biggest project you are working on today?

**Stephen Campbell:** The biggest project we are working on is the commercialization of our process to make cathode materials for lithium-ion batteries. We have a number of different materials. The high-nickel materials is a big interest so is the high-voltage spinel materials.

**Peter Clausi:** Now the lithium-ion batteries have been in existence really since late 1970s, commercialized in early 2000s. You are saying you have a new process for the lithium side or the cathode side of the battery?

**Stephen Campbell:** The cathode material side of the battery, the technology that was invented in the 1970s. As the market expands drastically for battery electric vehicles there is a potential for looking at that technology again and we have a new process that we believe is much better, much more efficient and makes better material.

**Peter Clausi:** What is the difference?

**Stephen Campbell:** The difference is that the traditional way is very much a solid state reaction. The lithium and cobalt you just grind the two together and fire it whereas we mix our

metals together in solution and then fire them all later so the firing time is much shorter.

**Peter Clausi:** Do you think they will make for a longer lasting battery?

**Stephen Campbell:** It should do because the homogeneity is really, really important and as materials get more complicated and the new materials that are coming out they are very, very much more complicated and so they need better control over how you make it and the solid state you really cannot do that.

**Peter Clausi:** Does that have the same memory fatigue that you find in other lithium-ion batteries?

**Stephen Campbell:** Similar, but it is better. They suffer from the same.

**Peter Clausi:** So the fatigue is actually less not better.

**Stephen Campbell:** Yes, it is. It depends how you say it. The battery is good, not bad.

**Peter Clausi:** How close are we to commercialization?

**Stephen Campbell:** Very close. We have a process. We have a pilot plant where it is scalable. We proved it...to access the complete interview, [click here](#)

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