

3M NMC Cathode Technology Confirmed by U.S. Patent Office

A key 3M patent for lithium ion battery nickel-manganese-cobalt (NMC) cathode technology has emerged from reexamination at the U.S. Patent and Trademark Office (USPTO) with all original claims being confirmed as patentable and with no amendments (U.S. Patent 7,078,128). NMC cathode technology is widely used in lithium ion batteries for consumer electronics and electric vehicles. The patented technology enables lithium ion battery makers to design electrodes for specific applications for optimum balance of power, energy, stability and cost.

“The value of the 3M innovation in NMC technology lies in the single phase crystal structure of the cathode materials,” said Kevin Eberman, research manager for 3M’s Battery Materials Business. “Practical high energy battery cathode materials must perform over hundreds of cycles, and 3M single phase materials show excellent charge-discharge capacity.”

“We are very pleased with the USPTO decision, which confirms our confidence in the patent and in the value of the technology,” said Christian Milker, business manager for 3M’s Battery Materials Program.

The performance of single phase crystal structure compared to layered structures is described by McCalla, Li, Rowe and Dahn in a published article in the *Journal of Electrochemical Society* titled, “The negative impact of layered-layered composites on the electrochemistry of Li-Mn-Ni-O positive electrodes for lithium ion batteries” where the data suggested that layered-layered nano-composites should be avoided.

3M pioneered the development of the unique mixed metal oxide cathode technology in the early 1990s in collaboration with Dr. Jeffrey Dahn, at Dalhousie University, Nova Scotia.

3M has a number of product solutions and a broad-based technology portfolio targeting lithium ion batteries including anode powders, cathode powders and electrolyte additives. For more information on 3M Battery Materials and NMC cathode licensees visit www.3M.com/batterymaterials.

About 3M

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