

# Toyota and Argonne National Laboratory Investigate Recycling of Lithium-Ion Batteries

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**ANN ARBOR, Mich. (April 30, 2024)** – Toyota Motor North America (‘Toyota’) announces that it has entered a Cooperative Research and Development Agreement (CRADA) with the U.S. Department of Energy’s Argonne National Laboratory to investigate the development of a direct recycling process for lithium-ion batteries, which are prevalent in new electric vehicles. The focus of the research will be on cathode chemistries made of nickel, manganese, and cobalt.

“Having Argonne utilize our commercial battery products will help us evaluate the direct recycling process at an industrial scale, in addition to other battery recycling technologies to maintain a diverse portfolio of recycling options for a diverse array of battery platforms and chemistries,” says Nik Singh, Senior Scientist in the Toyota Research Institute of North America (TRINA)’s Materials Research Department. “Toyota is in a unique position to bridge aspects of fundamental research with product evaluation, development and commercialization, to help its U.S. battery manufacturing achieve better circularity and supply chain security.”

For the project, Toyota will provide Argonne with both end-of-life and new Toyota batteries. Argonne will adapt and test its patent-pending direct recycling process with the batteries. Further, TRINA, Toyota’s in-house entity for exploring next-generation technologies, will lend its expertise to validate this “proof-of-concept” study.

“Based on preliminary projections, direct recycling can potentially offer significant cost and carbon footprint savings,” says Sarah Kennedy, Operations Manager of Toyota’s Battery Lifecycle Solutions Business Development team. “Toyota’s Battery Lifecycle Solutions entity will help identify the appropriate pathway for the potential future commercialization of this technology, pending the outcome of the CRADA, as the project is projected to deliver a net improvement in battery materials manufacturing costs, waste and carbon footprint.”

The collaborative project with Argonne is part of Toyota’s pursuit of designing a closed-loop battery ecosystem aimed at maximizing sustainability. In 2015, Toyota announced the Environmental Challenge 2050, a set of goals to achieve carbon neutrality across the vehicle lifecycle by 2050. For electrified vehicles, this includes battery recycling, whether after first use or after being repurposed or refurbished, to ensure that raw materials are extracted and put back into the production process.

Additional information about the project and Argonne’s research at its ReCell Center can be found [here](#).