

Waste silicon sawdust recycled into anode for lithium-ion battery

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A production process from silicon sawdust to lithium battery anode. Credit: Hirotomo Nishihara

Researchers have created a high performance anode material for lithium-ion batteries (LIBs) using waste silicon (Si) sawdust.

It is energy-consuming and expensive to produce Si wafers with high purity (> 99.99%). On top of that, some 50% of Si is actually discarded as industrial waste in the final cutting process. This waste is about 90

thousand tons a year worldwide, an amount large enough to meet the global demands for [anode materials](#) for LIBs.

To make this happen, under the project of "Dynamic Alliance for Open Innovation Bridging Human, Environment and Materials," a joint research team from Tohoku University and Osaka University has developed a practical and mass-producible method of recycling the unwanted Si sawdust into a high-performance anode material for LIBs.

The team found that the pulverization of the Si sawdust into Si nanoflakes (~16 nm in thickness) and the subsequent carbon coating are effective in fabricating high [capacity](#) and durable LIBs. So far, a test half-cell has achieved a constant capacity of 1200 mAh/g over 800 cycles. This capacity is 3.3 times as large as that of conventional graphite (ca. 360 mAh/g).

The proposed method of material recycling is applicable for the mass production of high-performance LIB anode materials at a reasonably low cost. The research team expects that it will have great practical use in the battery industry.

More information: Takatoshi Kasukabe et al, Beads-Milling of Waste Si Sawdust into High-Performance Nanoflakes for Lithium-Ion Batteries, *Scientific Reports* (2017). [DOI: 10.1038/srep42734](https://doi.org/10.1038/srep42734)

Provided by Tohoku University

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