

# New Anode Technology Means Fast Battery Charging

*In certain cases, the lithium in lithium-ion batteries can work its way out of solution and deposit on the graphite anodes, causing a dangerous chain reaction known as thermal runaway. New materials can be used in place of graphite to prevent this from happening.*

## The Challenge

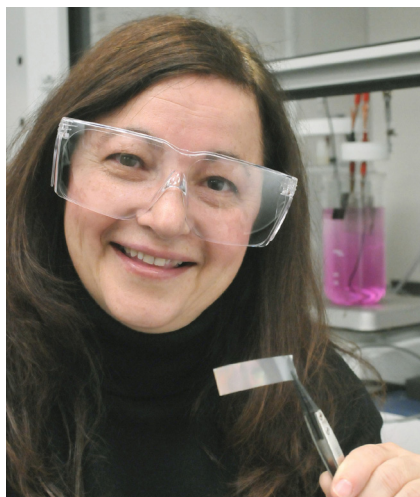
Find an alternative to graphite anodes in order to improve the reliability and safety of lithium-ion batteries.

## The Solution

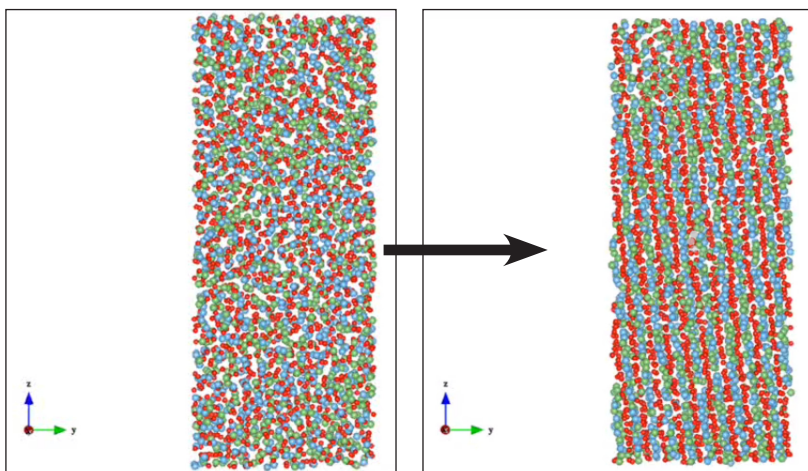
Tijana Rajh, Christopher Johnson and their team created anodes for lithium-ion batteries out of titanium dioxide nanotubes.

## The Results

As well as increased battery stability, the researchers unexpectedly discovered that nanotubes composed of titanium dioxide can switch their phase as a battery is cycled, gradually boosting their operational capacity. Laboratory tests showed that new batteries produced with this material can be recharged up to half of their original capacity in less than 30 seconds.



*Argonne nanoscientist Tijana Rajh holds a strip of material created from titanium dioxide nanotubes.*



*The internal structure of titanium dioxide re-orient itself in a way that dramatically improves battery's performance.*

*"It is the deeper understanding of materials' behaviors that will unlock mysteries of materials that are used in electrical energy storage systems," says Jeff Chamberlain, principal chemist at Argonne.*