

Research group develops “superior conducting” solid state lithium battery

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Source: wikipedia

A Japanese research group has developed a solid state lithium battery that appears to perform just as well as conventional liquid lithium ion batteries. The group has published their results in *Nature Materials* and claim to have found a solid electrolyte that performs on a par with current liquid technology, and does so over a much broader temperature range and because it's solid should be more compact as well as less sensitive to physical damage and fire hazard.

Lithium ion batteries are currently used in a wide variety of consumer electronics (and electric vehicles) due to their energy density, re-chargeability and slow loss of power when not in use. The problem with them has been that they are rather fussy due to the liquid [electrolyte](#) that

serve as the means of moving ions from negative to positive electrodes. Because of these problems, researchers have spent a considerable amount of time and money over the last few years trying to develop a solid type of lithium battery that would have all the good characterizes of the liquid batteries without the negatives. Until now, such efforts have been rather fruitless as most solid state lithium batteries have not been able to conduct as much ions, or were unstable or sensitive to temperature variations.

The new material discovered by the Japanese team still uses lithium to move the ions, but covers it with a crystal lattice that creates pores for the ions to pass through when pushed, but holds them still when they're not. Made of sulfur, phosphorus and germanium, the outer structure creates the channels through which the ions are able to move.

In tests performed by the team, batteries with the new material demonstrated conductivity equal to existing lithium ion batteries, which they say is about double that of other solid state lithium batteries. In addition, they say the battery works in temperatures ranging from 100°C to -100°C.

The team also noted in the paper that the process of making the new material is relatively simple and inexpensive though exact details were not given.

If such new batteries can be mass produced and introduced into actual products, it's likely to lead to a reduction in prices for consumer electronics, but especially so for electric vehicles as the battery alone in many make up nearly half its price.

The authors of the paper didn't specify how close they were to bringing their new technology to market.

Via [Ars Technica](#)

More information: *Nature Materials* (2011) [doi:10.1038/nmat3066](https://doi.org/10.1038/nmat3066)

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