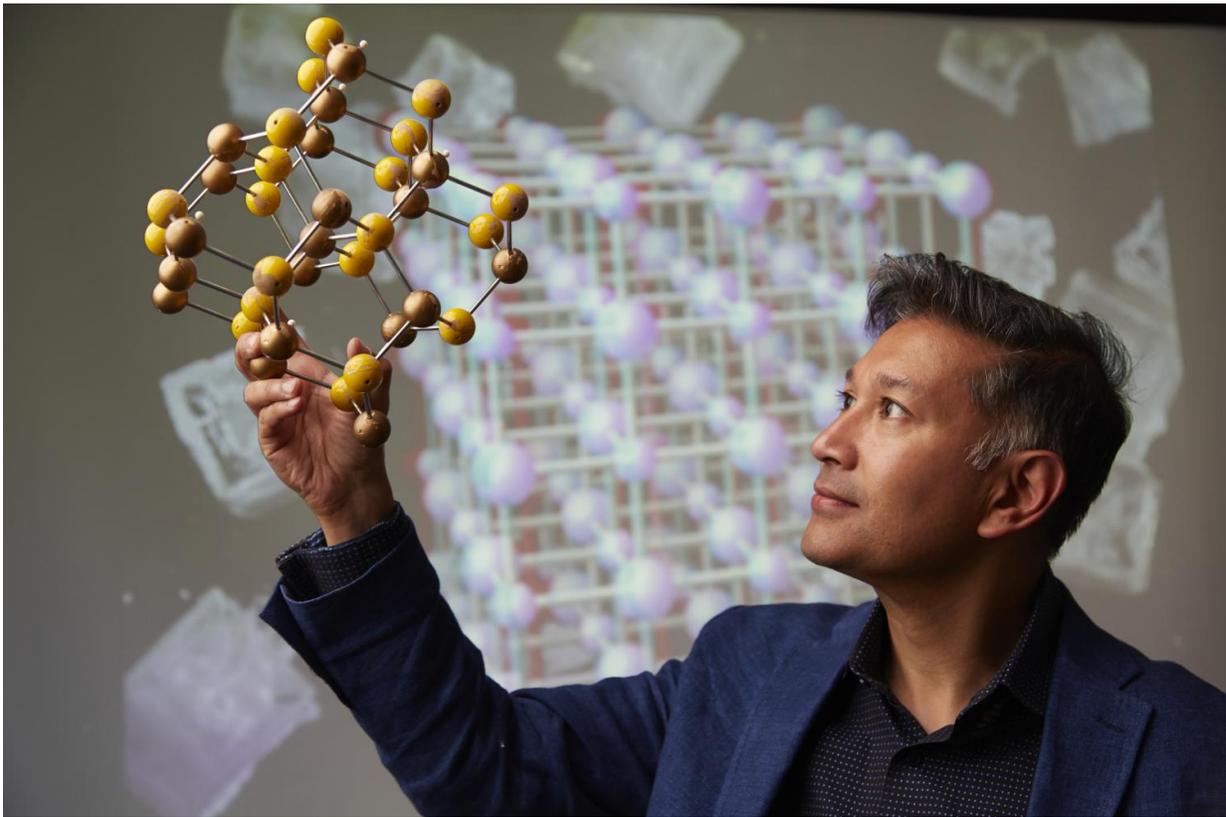


Faster recharging batteries possible after new insights

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Professor Saiful Islam. Credit: The Royal Society

Faster recharging lithium batteries could be developed after scientists figured out why adding charged metal atoms to tunnel structures within batteries improves their performance.

Rechargeable lithium batteries have helped power the 'portable revolution' in mobile phones, laptops and [tablet computers](#), and new generations of lithium batteries are being developed for electric vehicles and to store energy from wind and solar power.

Now the research groups of Professor Saiful Islam of the Department of Chemistry at the University of Bath, and Professor Reza Shahbazian-Yassar at the University of Illinois at Chicago, have gained important insights to help improve the performance of [lithium batteries](#), published in the leading journal *Nature Communications*.

Storing electrical energy more quickly than current electrodes is important for future applications in portable electronics and electric vehicles.

It was recently discovered that that large metal ions such as potassium can improve charge storage in batteries, but it wasn't understood why this was the case.

The research teams used a powerful combination of structural experiments and computer simulations to unravel for the first time why adding charged potassium into tunnel-like structures of low-cost manganese oxide has a strong beneficial effect on the battery performance.

They discovered that adding positively charged ions increased how fast lithium moves within the tunnel structures, which is crucial to improving the charging of batteries.

Professor Islam said: "Understanding these processes is important for the future design and development of battery materials, and could lead to faster charging batteries that will benefit consumers and industry.

"Developing new materials holds the key to lighter, cheaper and safer batteries, including for [electric vehicles](#) which will help cut carbon emissions."

More information: Yifei Yuan et al, The influence of large cations on the electrochemical properties of tunnel-structured metal oxides, *Nature Communications* (2016). [DOI: 10.1038/ncomms13374](https://doi.org/10.1038/ncomms13374)

Provided by University of Bath

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