

New Sulphur Chemistry Possible Key to Greener Batteries



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University of Adelaide researchers are developing the next generation of batteries using cutting-edge sulphur chemistry which will reduce their environmental impact.

“Our innovative work on sulphur oxidation processes is pushing the boundaries of the design of the next generation of batteries,” said the [University of Adelaide](#)’s Professor Shizhang Qiao, Director, Centre for Materials in Energy and Catalysis.

“Sulphur is an important electrode material in metal-sulphur batteries due to its abundance on Earth and its chemical properties which may improve the capacity of batteries.

“Sulphur could provide the key to improving the energy capacity of commercial lithium-ion batteries.”

Professor Qiao and his team have demonstrated for the first time the reversible electrochemical oxidation of a sulphur cathode, and have applied this new process into aluminium-sulphur batteries.

“We have achieved the highest voltage output of an aluminium-sulphur battery: approximately 1.8 volts of steady power output which is significantly greater than present technology which can only achieve approximately 0.6 volts output,” said Professor Qiao.

“Aluminium-sulphur batteries cost much less than current commercial lithium-ion batteries as the materials used in them are low-cost and environmentally friendly chemicals.”

Advances in chemical technology are reducing the environmental impact of batteries but the demand for the chemicals that they contain like lithium is in itself having severe impact on places where it is mined.

“The diminishing availability of natural resources places constraints on traditional social and economic models, calling for new and sustainable options,” said the University of Adelaide’s Professor Anton Middelberg, Deputy Vice-Chancellor (Research).

“Fundamental research such as this undertaken at the University of Adelaide will have far-reaching benefits for society,”

This innovative study of the sulphur oxidation process, which was published in the journal [Nature Communications](#) , benefits the understanding of sulphur chemistry.

“Our research provides valuable inspiration for the design of other metal-sulphur batteries, not just ones that use aluminium-sulphur technology,” said Professor Qiao.

Read the [original article](#) on The University of Adelaide.