

Lithium from the coal in China: Extracting lithium metal from Chinese coal

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Coal from China could become a major source of the metal lithium, according to a review of the geochemistry by scientists published in the *International Journal of Oil, Gas and Coal Technology*.

Lithium is an essential component of [rechargeable batteries](#) used almost ubiquitously in mobile gadgets such as phones, laptops, tablet computers and in many electric vehicles. Worldwide annual consumption of this metal grew from 15100 tonnes in 2003 to 37000 tonnes by 2012, a 145 percent increase and demand is expected to rise even further as we move more towards sustainable power and electrical storage capacity increases.

Shenjun Qin of Hebei University of Engineering, in Handan, China, and colleagues point out that [coal](#) is a highly polluting energy source that is still widely used for electricity generation and other applications. They suggest that the recovery of valuable rare metals from coals or coal-processing byproducts could be a promising way to make the inevitable long-term use of this fossil fuel resource more economic, efficient and cleaner. Indeed, the extraction of [lithium](#) from coal would offer an ironic twist to its continued use.

The team explains that lithium has been found dispersed and even anomalously enriched in coal deposits, and is potentially extractable. They explain that two analytical techniques inductively coupled plasma mass spectrometry (ICP-MS) and inductively coupled plasma as an excitation source (ICP-AES) are widely used for assaying the chemical elements in coal and coal ash and either of these techniques could be

used widely to optimize sources for lithium, or any given metal, for subsequent extraction.

The team has also reviewed two techniques for lithium extraction. The first, a patented technology for extracting both lithium and aluminum metals from coal ash involves sulfur sintering the ash and acid leaching the metal from the solution to obtain [lithium carbonate](#) in a yield of 95.6 percent, actually recovery of the [metal](#) is 60 percent. The second approach, alkali sintering avoids the need for the sulfur step but has a lower yield at 85.3 percent and a recovery of 55 percent.

"Although the investigation into lithium recovery from [coal ash](#) is still at a laboratory scale," the team reports. "This progress will promote the green and efficient application of coals and would benefit to the lithium-demanding industry."

More information: Qin, S., Zhao, C., Li, Y. and Zhang, Y. (2015) 'Review of coal as a promising source of lithium', Int. J. Oil, Gas and Coal Technology, Vol. 9, No. 2, pp.215-229

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