

Will lithium-air batteries ever take flight?

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Amid growing climate concerns, many governments and scientists worldwide are trying to reduce air travel's environmental impact. Electric planes are a possible solution, but better batteries are needed to power large aircraft for long distances. Lithium-air batteries, one of the most promising technologies, face challenges in taking flight from the

lab bench to the friendly skies, according to an article in *Chemical & Engineering News (C&EN)*.

Small, short-distance electric aircraft can be powered by [lithium-ion batteries](#), the rechargeable technology that powers cell phones, laptops and electric cars (and was recently recognized with a Nobel Prize). However, the best [lithium-ion](#) batteries have a specific energy of about 250 W h/kg—much less than the 800 W h/kg needed for a Boeing 737 to fly from Chicago to New York City, contributing editor Tien Nguyen writes. Lithium-air batteries theoretically offer a maximum specific energy of 3,460 W h/kg, and the oxygen required for the batteries' operation could be supplied by a plane's onboard air storage and filtration systems, experts say. But first, scientists need to overcome a spate of obstacles that limit the technology's practicality.

Compared with lithium-ion technology, [lithium-air batteries](#) have a more complex chemistry that uses oxygen to oxidize a lithium-metal anode. As a result, the electrolyte solution, which conveys lithium ions from anode to cathode, decomposes quickly, limiting the batteries' rechargeability. Scientists are searching for more stable electrolytes, but so far the best alternative allows only about 90 charging cycles (far short of the thousands of charging cycles possible for lithium-ion batteries). Another challenge is whether the batteries could run on air rather than pure oxygen, which is piped in for lab-scale batteries. Carbon dioxide or water in air could interfere with the chemistry. However, recent studies suggest that water might not be as problematic for the batteries as once thought, and scientists say that carbon-capture technology could be used to remove [carbon dioxide](#) from air.

More information: "Batteries Need a Boost to Fly the Friendly Skies," [cen.acs.org/energy/energy-stor ... -fly-friendly/97/i42](http://cen.acs.org/energy/energy-stor...-fly-friendly/97/i42)

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