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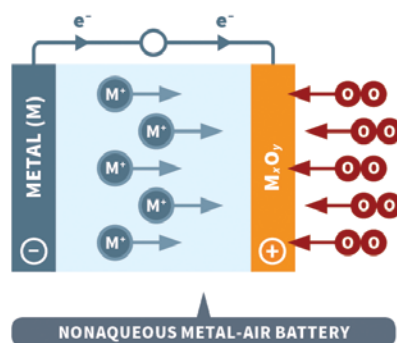
A collaboration between C&EN and
Andy Brunning, author of the popular
graphics blog *Compound Interest*

METAL-AIR BATTERIES: PRESENT AND FUTURE

In the future, metal-air batteries could exceed the energy storage abilities of common lithium-ion batteries. Here we look at their potential and compare the different types being developed.

HOW METAL-AIR BATTERIES WORK

Metal-air batteries use a metal anode and a porous air cathode. Their theoretical energy density is higher than lithium-ion batteries' current energy density (250 W h/kg), but they aren't yet as stable and can't be recharged as often. Currently, metal-air batteries have few commercial uses, but scientists are exploring a Li-air version for use in regional airplanes; that battery would need an energy density of at least 700 W h/kg.

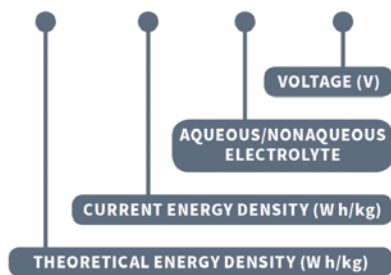


CURRENT USES



Zinc-air batteries are the only type of metal-air batteries with widespread commercial uses. Nonrechargeable Zn-air batteries are used in hearing aids and railway signals. Rechargeable Zn-air batteries have been used as backup batteries for solar panels.

KEY



Li-AIR BATTERIES



Mg-AIR BATTERIES



Al-AIR BATTERIES



Zn-AIR BATTERIES

