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A BREAKTHROUGH IN POWER ACCUMULATION (FLUORIDE ION BATTERIES)

Scientists from Honda Research Institute, together with researchers at the California Institute of Technology and NASA's Jet Propulsion Laboratory (JPL), recently made a splash in fluoride-ion battery (FIB) technology.

Scientists succeeded in achieving the ability to run energy cells at room temperature rather than heating them to at least 150 degrees Celsius. Fluoride-ion batteries offer high energy density but modern research has shown their operation only at high temperatures because the electrolyte is a solid material. At the the same time making fluoride-conducting liquid electrolytes that more readily conduct ions isn't exactly a straightforward proposition. Fluorides don't dissolve much and, if they do, they rather react than stick around to carry charge. Nevertheless, the solvents tried can't support a high concentration of fluoride ions or a useful operating voltage for high energies. There has additionally been a problem of electrode materials dissolving in the electrolyte, expediting battery failure.

All of these issues have been addressed with a liquid electrolyte made useful by its salt design, choice of solvent and by putting a protective shell around the copper electrode material that lets fluoride in but keeps the solvent away. The materials currently being tested are cerium, lanthanum, and copper-based. And those elements are more plentiful than cobalt and lithium usually used in batteries today. The research team is still trying to get naturally-occurring calcium fluoride to work as an anode, which would additionally give their FIB a "significantly lower eco-footprint."

Eventually FIB can embody all advantages of lithium ion battery (LIB) and get rid of its flaws.

Advantages of BFI compared to LIB are as follows:

1. The energy density of FIB ten times than LIB.
2. FIB can be high voltage one unlike the LIB.
3. FIB manufacturing is cheaper than LIB one.
4. Recycling of FIB not so harmful for habitant as LIB's one.