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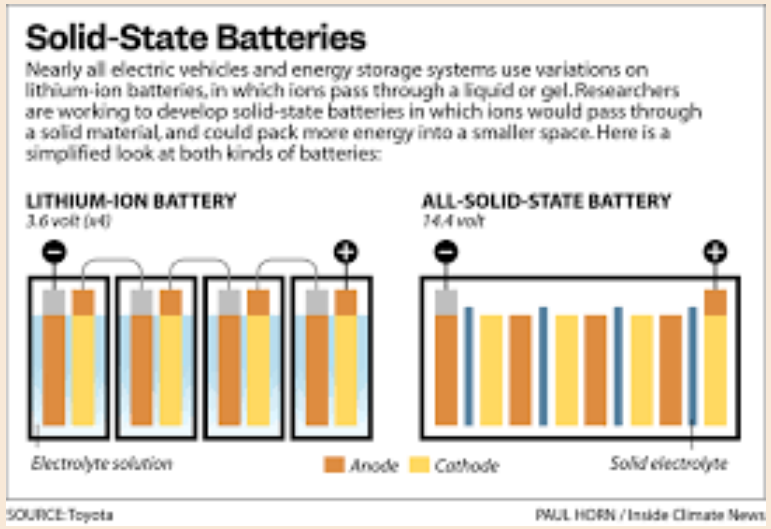
Could Going Hybrid be the Answer to Better Batteries?

… and has zealousness trumped pragmatism?

Solid-state is the “holy grail”



I’ve done previous posts on the state of solid-state batteries because I’m drawn to any technology that offers the potential of a major leap forward.

Today, lithium-ion is the only viable game in town. However, long-term, I believe better technologies will prevail. The question is when?

The Promise of Solid-State

- Solid-state batteries use a solid electrolyte from materials like ceramic versus the liquid electrolyte employed with lithium-ion.
- The approach offers more power, longer distances, shorter charge times, better safety, and potentially lower cost.

The Technical Roadblocks

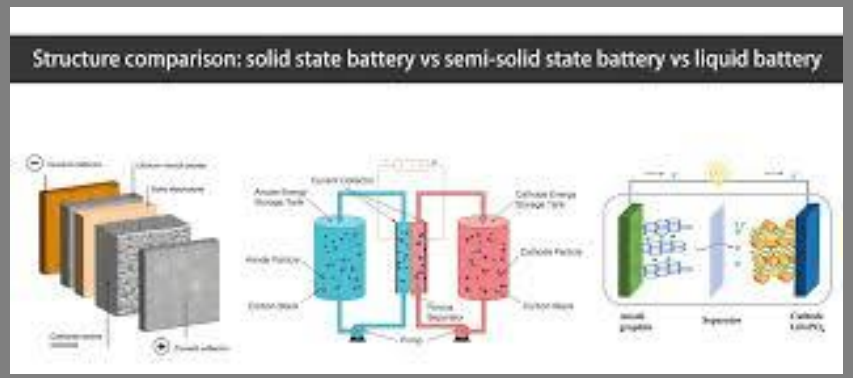
- Many challenges remain including creating a stable interface between the electrolyte and electrodes, brittleness which can reduce durability on roads, and thermal management, particularly in dealing with extreme cold temperatures.
- Producing solid-sate batteries is also no simple matter. The complexity and scalability of the fabrication processes remains a challenge.

Work continues, but timeframes remain uncertain

But Julia Poliscanova, senior director of vehicle and e-mobility at Transport & Environment offers this perspective on the state of solid-state:

"...every time I speak with automotive executives at battery conferences, I keep hearing the same answer: 'We are five to seven years away.'"

- Toyota has been touting a solid-state battery for some time. The target for mass production is now somewhere in the 2027 to 2028 timeframe.
  - Last year the company indicated a breakthrough in addressing durability.
  - The projected battery range is 1000 km (621 miles) with a 10-minute charging time.
- Earlier this year, Nissan indicated it plans to launch its solid-state battery for EVs by early 2029.
- Mercedez-Benz Group and U.S. startup Factorial are working together with the expectation of being in production by the end of the decade.
- Factorial is also working with Stellantis, Hyundai, and Kia.



Semi-solid-state batteries use a hybrid design which combine both a solid and liquid electrolyte.

Some analysts view this approach as a bridge to fully solid-state.

Does that sound familiar?

Hybrid designs already proving viable

- Guess what? The development of semi-solid-sate batteries is being led by Chinese companies. Shocking right?
- This includes CATL, one of the world's largest battery manufacturers, WeLion, Qingao Energy, and Ganfeng Lithium.
- Nio, a Chinese EV manufacturer has already incorporated a 150-kilowatt-hour semi-solid-state battery in its EVs with a range of 1,000 kilometers (621 miles).
- A subsidiary of Ganfeng Lithium is producing one with a range of 530 kilometers (329 miles).

Reportedly, the Chinese government is investing over $830 million to develop solid-state batteries with the goal to build a solid-state battery supply chain by 2030.

Yet, they have taken a pragmatic approach by using a hybrid design as a bridge.

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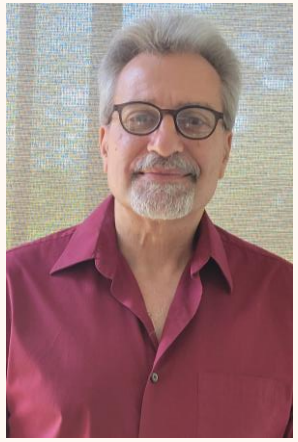

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