

Solid-State Battery Hype and Intellectual Property

Examining the crowded intellectual property landscape for solid-state battery technology

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The potential of—and intense recent interest in—solid-state batteries has led to a barrage of financial investments and development efforts by both battery manufacturers and automotive OEMs to bring this technology to market. Recent patent activity in this area has grown faster than most other aspects of lithium-ion battery technology, according to a 2020 report by the European Patent Office (EPO) and International Energy Agency (IEA), creating a crowded intellectual property landscape for solid-state batteries even before their successful commercialization. In this rapidly evolving market, it has become increasingly important for major players to understand this emerging technology not just from a technology perspective but from an intellectual property perspective as well.

The Promise of Solid-State Battery Technology

Recent activity in the world of solid-state batteries has generated a flurry of public interest. Frequent news articles in major media outlets are popping up highlighting the latest technological advancements from companies and academia. Many startups in this field are coming out of stealth mode with major updates and deliverables expected in the next few years. Multi-billion-dollar valuations and investments suggest many see this technology as a potential game changer for the electric vehicle market. To that end, most major auto OEMs already have solid-state batteries in their technology roadmap in some form.

While many other promising innovations in lithium-ion batteries are also being developed, none has captured the attention of the public in the past year like solid-state batteries. Solid-state batteries in this context are a type of lithium-ion battery, where the conventional liquid electrolyte is replaced with a solid-state material. This swap unlocks the theoretical possibility of using lithium metal as the anode material instead of graphite, which may lead to a substantial increase in energy density and a similar boost in EV range. Proponents of this technology are also touting a number of other benefits, such as faster charge times and improved safety.

More Money, More Patents

The money and market share at stake have led to a flurry of investments by both battery manufacturers and auto OEMs in the past 5 years, leading to a corresponding flurry of patent activity. The 2020 EPO-IPA joint study on battery innovation offers a detailed analysis of the recent patent landscape for electricity storage. Even though patent activity in lithium-ion batteries more than doubled from 2010 to 2018, the report shows that the portion of patent activity involving solid-state electrolytes grew 450% during this period, highlighting the growing interest in this technology. The actual growth is likely even higher than stated in the report, as innovation around manufacturing and the lithium metal anode are both needed and vital to the successful commercialization of these batteries, something not captured in the report metrics.

The patent activity for solid-state batteries is uniquely driven more by automotive OEMs than other aspects of lithium-ion innovation. This is manifested both in terms of exclusive partnerships with startups generating the IP as well as in-house R&D leading to individually owned IP. For example, patent activity by Toyota represented 5.3% of all patent activity in lithium-ions from 2014 to 2018 but represented 15.4% of activity in solid-state electrolytes during the same period. To the extent one solid-state technology is dramatically successful over other options being explored, IP ownership by a limited

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number of manufacturers could impact its widespread rollout.

How Exponent Can Help

Players in this competitive space currently face expensive choices over where to focus their efforts and investments. Exponent and its team of battery scientists and engineers are uniquely qualified to help clients not only understand the viability of these emerging technologies but also how these technologies fit into the intellectual property landscape.

For over 50 years, Exponent has been among the foremost global leaders in assisting businesses, attorneys, and inventors with issues pertaining to intellectual property. Exponent's diverse team of battery experts comprises consultants in multiple scientific and engineering disciplines with significant experience in various aspects of intellectual property, including infringement, validity, claim interpretation, prior art, trade dress, trade secrets, due diligence, and valuation. This experience, combined with testing capabilities that range from medium volume to research level across the entire product lifecycle, make Exponent's breadth and depth of battery expertise unparalleled.



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