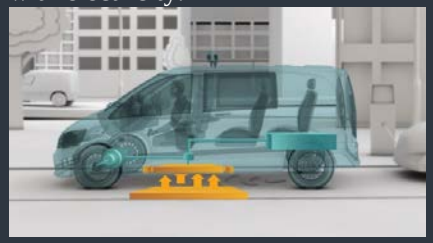
Technology & Commerce!

PRIMOVe

We're all used to combustion-driven vehicles that are "recharged" by stopping for a few minutes at the fuel station. Electric cars don't need to be any different. With PRIMOVe technology, energy is transferred at high power to ensure a quick and efficient turnaround.

The PRIMOVe charging concept is designed around existing operations, ensuring continuous service – for anything from delivery vans to taxis. In the case of delivery vans, high power charging points can be installed underground at loading docks to enable quick recharging while the vehicle is being loaded and unloaded. With taxis, inductive recharging segments can be integrated beneath taxi ranks at railway stations and airports to allow vehicles to charge while queuing for their next customers. The process is fully automated and driver-friendly – no special training is required and the driver never comes into contact with electricity.



Bombardier PRIMOVe

If you are of great antiquity, like myself, you may remember Bombardier as the manufacturer of mini bikes. However in recent times Bombardier have been producing slightly larger devices; Trains. If you have travelled on Vline's sleek commuter trains you have been on one of Bombardiers device, and Oh yes, if you own a Learjet you're on another of their products.

With the introduction of the PRIMOVe system Bombardier has come up with a high power induction charging system for a range of battery powered commercial vehicles including busses, light rail and delivery vans.

Because PRIMOVe is a contactless energy transfer solution, the system operates reliably under all circumstances – even in adverse ground conditions involving sand, snow or ice. This liberation from the constraints of overhead cables or elevated charging systems provides urban planners and public transport operators more freedom and flexibility in designing their vehicle solutions. The concept of high power opportunity charging allows for a battery design that can be much smaller and lighter, thereby extending battery life and reducing energy consumption. Most importantly, the vehicle can now carry its maximum number of passengers instead of the extra weight of heavy batteries.

ISSUE
59
Apr,2014

JOURNAL OF THE ATA
ELECTRIC VEHICLE INTEREST GROUPS
GEELONG & MELBOURNE

Lampo3 GT a reality?

The electric Lampo3 sport cars have been tested for more than 40.000 km on circuits and streets all over Europe. Since the results are more than promising there may be a Lampo3 GT dealer setting up shop in the near future.

The latest iteration from the Swiss company sees lighter and stiffer chassis, (optimized for production by ThyssenKrupp System Engineering); a new 42 kWh battery pack supplied by Akasol Engineering of Germany. Protoscar is not only focused on zero emission vehicles, but also the energy needed to let them move. All of the prototypes are powered by solar energy, produced at a remote 16 kW photovoltaic plant located in Tuscany, Italy. The energy produced there is put into the global grid and charges the Lampo prototypes around Europe The goal is to self-produce all the energy needed for the cars to counterbalance the entire consumption needed.

Protoscar Lampo3 GT

In 2009 Swiss engineering and design firm Protoscar unveiled its first Lampo electric sports car prototype. Now, the guys at Protoscar have unveiled, their latest, the Lampo3 electric sports car prototype. It features a light weight chassis over which a 2+2 sports car body is draped. Power comes from three electric motors--two on the rear axle and one on the front--rated at a combined output of 420 kW (560 horsepower) and 900Nm of torque. This design allows for improved dynamic behavior of the car thanks to optimized torque vectoring, not only between front and rear axles, but also between the two rear wheels (the motors actively drive on different adapted rpms for during curves, where the inner wheel turns slower than the outer wheel). Torque vectoring gives this 4 wheel drive the ultimate in stability control.

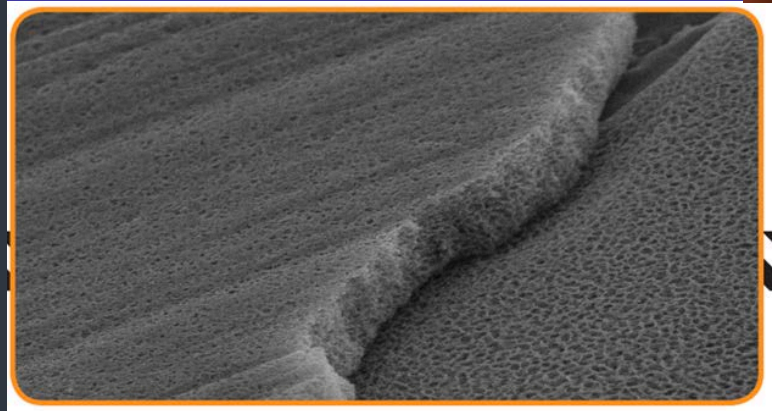
Feeding the motors is a newly developed 42kWh lithium-ion battery, which is good for a range of 200km. Performance numbers come in at 4.5 seconds for the 0-100kmh sprint and a top speed of 220kmh.

PVDF

Why is PVDF a better Lithium cell separator? You need a high-porosity separator in a Li-ion cell in order for the ions to flow back and forth between the electrodes. Higher porosity means less heat generated in the cell and more energy available to be used.

With regard to safety, the PVDF will not burn or support a flame. It's stable through to 160 degrees C, at which point it starts going into a gel state. A damaged cell may no longer function, but when the PVDF gets hot it tends to stay where it is even if you put a nail through it or have an internal short in the system. With a polyolefin separator, the tendency is for it to shrink away from any hot spot. By stretching it during manufacturing, energy is put into the system. If you have a short in the cell, you get a super hot spot. Then the polyolefin will shrink away from that spot, exposing the electrodes. This opens up the likelihood that the electrodes will come into contact and have a potentially catastrophic failure. Another advantage is in cycle life; because PVDF material is very sponge like, it flexes with each of these charge and discharge events. It's like a mattress. The surface porosity looks like new even after 1000+ cycles.

Porous Power



The quest for the perfect EV lithium cell has taken on a different manufacturing twist. Most cell separators on the market currently are polyolefins, either polypropylene or polyethylene. They are manufactured via a heat extrusion processes. After extrusion, they are stretched to make the film porous and to orient them. The problem is that the more you stretch them, the more energy is tensioned into their structure. When the cells get hot, this tension is released and causes shrinkage, which reduces performance and can cause shorting. Nonetheless, this is how they make state-of-the-art products that are going into the Li-ion batteries of today. Porous Power however are currently designing a better performing separator in the form of its proprietary polyvinylidene fluoride (PVDF) technology which will be available shortly. Polyolefin separators are reasonably good products for smaller electronic applications – cell phones, computers and power tools – but as you start getting into the larger format cell assemblies used in electric vehicles, you need something more.

Porous Power's polymer is not polyolefin. Instead PVDF is a very flexible polymer that is solution cast. In other words, the separator is cast into a substrate directly, it is never stretched. In production, it is coated onto another film – a sacrificial film. Then the high porosity PVDF is removed from the former. It looks like a kitchen sponge, as opposed to a rigid piece of plastic like polyolefin. Because the separator is cast, not stretched, the porosity is very high, exceptionally uniform and stable.

Look where EV's have gone now!!

Chip Yates Electric Plane Records

Chip Yates isn't one for half measures. He holds an electric motorcycle speed record, and—although he had no pilot's license—he decided he wanted to break the electric airplane speed record as well. He managed to get the license in two months. After completing the record flight, 14,698ft and 350Kmh, he made a dead-stick (engineless) landing when a battery developed a problem in midair. For this flight, he used a modified Long-EZ, a canard design by famed SpaceShipOne engineer Burt Rutan. Propelled by an enormous 192kw- water-cooled brushless DC motor, it's claimed to be the world's most powerful electric aircraft. His latest attempt is to fly across the Atlantic. However, since the energy densities of current batteries aren't up for such a feat, Yates needed to get creative. His team came up with a solution dubbed Infinite Range. The ambitious plan is the electric equivalent of midair refueling, with a twist – an in-flight battery swap. Battery packs will be housed in autonomous unmanned aerial vehicles (UAVs) that, once depleted, can be jettisoned and glide down to recharge stations, either on the ocean or on land. An internal battery will sustain the aircraft, while the fresh battery pack is flying up to rendezvous with the mother ship. More realistically, extra batteries mounted in wing and belly tanks at takeoff would be progressively jettisoned as there charge is depleted – which, of course, reduces weight and increases range.

This Month's Technology Review

Ewert Energy Systems of Illinois have released the Orion BMS that is CAN bus compatible with OEM BMS units from all the major Hybrid manufacturers, this simplifies the job of connecting extra battery packs to the likes of the Prius. As a BMS alone the Orion can handle from 12 to 180 cells. It performs intelligent balancing, calculates state of charge and discharge and charge current limits. Price for an average 144V system is $950. http://www.orionbms.com/ for full details