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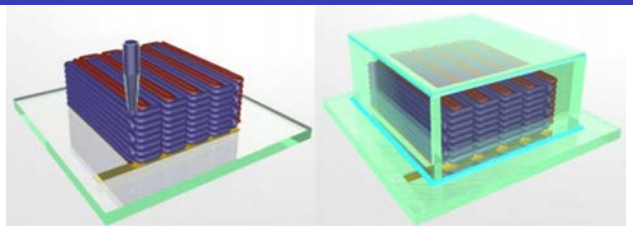
OXIS Lithium Sulfur Batteries

The lithium-sulfur battery theoretically has up to five times the storage density of lithium-ion (in practice maybe triple), along with good safety and deep-discharge behavior. However, persistent problems, especially with cycle life, have been a challenge to commercialization. Critical reactants are permanently lost due to solubility reactions, when they pass through a polysulfide stage during cycling. Early cells had a cycle life in the single digits, although recent versions have done much better (vehicle applications require several thousand cycles).

Recently U.K.-based polymer lithium-sulfur battery developer OXIS Energy closed a $24 million funding from South African investor Sasol New Energy, followed by a contract from the British Ministry of Defense. The OXIS developments highlight encouraging advances for lithium-sulfur battery technology with 500 cycles.

OXIS Energy was founded in 2004 in Oxford, U.K. The company states it has been granted 27 patents, with 32 additional pending. If successful in controlling the recharge problems then a Chevy Volt with a 70kg battery pack or a Nissan Leaf with a 320km range would be possible. There is unlikely to be similar headroom for improvement in lithium-ion battery technology at this point.



Sandgrain Batteries

In a technological follow up on the Xerox printed battery concept of issue 49, it seems that Harvard Researchers have taken it to the next level. – While we're currently witnessing the rise of tiny electronic devices such as biosensors, many of those devices do have one limiting factor – they still require not-so-tiny batteries, which ends up somewhat defeating the whole miniaturization process. Although some devices can get their power from external sources, scientists from Harvard University and the University of Illinois at Urbana-Champaign have come up with an alternative ... functional 3D-printed lithium-ion batteries no larger than a grain of sand. The batteries' anodes and electrodes are made from two types of electrochemically active ink, which are extruded through a printer nozzle that's narrower than a human hair. The ink used to create the anodes contains nanoparticles of one lithium metal oxide compound, while nanoparticles of another similar compound are present in the ink used in the cathodes. Both components are built up by depositing successive layers of the quick-hardening ink onto a comb-shaped surface. The resulting anode and cathode end up face-to-face, their electrodes (the teeth of the two combs) interlaced with one another. The assembly is then encapsulated in a tiny case, an electrolyte solution is added, and a working microbattery is the result.

Imagine what batteries you can print in a car!

Lightening Superbike

In a shock to the masses an electrically-powered superbike from Lightning Motorcycles (above) took home the gold for fastest motorcycle up the hill with a time just a touch over 10 minutes. Lightning's bike wasn't just the fastest electric motorcycle on the course; it was the fastest motorcycle *full stop* besting the next bike – a no-joke gas-powered Ducati Multistrada S – by a solid 20 seconds. It wasn't an overall fastest time for a bike, Carlin Dunne's near ten-minutes-dead time was around seven seconds adrift of his Ducati-powered effort from last year-but still a brilliant victory. Congrats to the Lightning team.

Read more:
http://www.digitaltrends.com/cars/electric-motorcycle-takes-charge-at-pikes-peak-race-shames-even-gas-powered-rivals/#ixzz2Y3DB7Vgb

Pikes Peak

Monster Sport E-Runner

A lot has been happening in the last month relating to EV racing – as such this issue looks at several of the latest EV triumphs.

Nine-time Unlimited division champion Nobuhiro "Monster" Tajima has broken the 10 minute barrier with an electric vehicle at Pikes Peak even surpassing the 9:51.278 he turned in during the 2011 race in a 900 hp Suzuki SX4, when he was the first driver ever to crack the Peak's elusive ten-minute barrier.

The new EV record now stands at 9:46.530 beating the 10:15.380 set by Fumio Nutahara for Toyota Motorsport in 2012 and was just a smidgen shy of 2012 outright winner Rhys Millen who set 9:46.164 in a 700 hp Hyundai Genesis.

This time placed Tajima in outright 5th position followed by two Mitsubishi MiEV Evolution II in 13th and 14th respectively.

Sébastien Loeb took out the event in a time of 8:13.878 in a 900Hp 900 kg Peugeot 208 T16

E1PC Specs

Chassis

Frame	Twin Spar Carbon Fiber
Wheelbase	1435mm
Front Suspension	Custom Carbon Fiber Oval Slider
Front wheel travel	127mm (5in)
Front wheel	10-spoke mg 3.50 x 17
Front Tire	Pirelli 120/70
Rear wheel	10-spoke Mg 6.00 x 17
Rear tire	Pirelli 200/55
Front brake	2 x 320mm full-floating discs, 4 piston,
Rear brake	220mm disc, 2-piston
Dry weight	238kg

Batteries

Cells	Dow Kokam Lithium Polymer
Energy	14kWh
Voltage	330V+

Motors

Type	Proprietary Liquid Cooled, Permanent Magnet, Brushless DC
Power	150+kW
Torque	220Nm
Motor Controller	150kW Liquid Cooled
Transmissi	

MotoCzysz 2013 E1PC

As we saw at last month's meeting MotoCzysz has won its fourth straight TT ZERO on 5/6/2013, in a stunning defeat of the Honda backed Mugen Shinden who many thought would win this year. MotoCzysz' Mike Rutter and Mugen's John McGuiness finished just 1.67 seconds apart, almost a photo finish, with both just shy of the 110 miles/hr lap speed threshold which were assuming could be beaten this year. The finish demonstrated the rapid improvements in electric motorcycle technology, with an almost 6 miles/hr improvement over the 2012 TT ZERO results. An interesting analysis of this year's race results indicates that back in 2009, the inaugural TT Zero race, depicted race speeds akin to the Norton Manx times of 1936, at 89MPH average lap speed. This year's average speed was 109.675MPH or equivalent to the 1975 Kawasaki 750 triple times. Not a bad technology development; 40 years of internal combustion development in 4 years of EV upgrades. The question arises, how long until the Electrics outperform the ICE bikes?

For most of the race, John McGuiness aboard a Honda Mugen actually led Michael Rutter, MotoCzysz by as much as 9 seconds at one point. But after the Bungalow timing point, Rutter put on the amps not only catching up but pulling ahead for the win. At the Sulby Speed Trap, Rutter was measured at 142 miles/hr, and McGuiness hit 131 miles/hr. The bikes from Czysz and Mugen were in a class of their own at the 109MPH average, the rest of the 8 bike field were in the 77 to 90MPH range. This may not be too surprising as the Mugen entry is rumored to have cost Honda a cool 4.5 million to develop.

Look What EV's Have Done Now!!

Drayson Racing - Record

The Lola B12 69/EV, that we explored about 15 months ago, is built by Drayson Racing Technologies (as in Lord Paul Drayson — he's also the company CEO and former minister for the Labour government) in Kidlington, Oxfordshire. The firm has been in operation since 2007 and focuses on sustainable automotive technology, demonstrating its latest advancements through the firm's race team. To demonstrate the potential of electric vehicles, Dayton just went ahead and set a land speed record last week at RAF Elvington in Yorkshire. There, the Lola hit a top speed of 328.6km/h, beating the previous 281.6km/h record set in 1974 by a General Electric Battery Box ELECTRIC World Land Speed Record car at Bonneville Salt Flats.

To do so, the Drayson team adapted their existing Le Mans prototype that used a 20kWh battery and 640kW electric power plant and modified the recycled carbon fibre chassis to minimise drag and to get its weight under the 1000kg limit to qualify for the FIA (Federation Internationale de l'Automobile) record.

See http://www.youtube.com/watch?v=4pbmbX6KuO4

This Month's Technology Review

Need to speed up the EV conversion/Build time? Here's an amazing system from MotoCzysz the D1g1tal Dr1ve; the 500mm x 330mm x 370mm red box contains the motor, controller, proprietary cooling system, final drive and differential in a neat 59Kg container. The motor, a Remy HVH 250 generates 75kW and up to 1150 N-m of torque.

Battery voltage can be as high as 320V with 200Amps continuous and 300Amps maximum drive. Maximum RPM is limited to 4300. Final drive can be between 2.7:1 and 7:1. All you need to make this beasty work is a traction pack a 12v auxiliary battery throttle and mount the drive shafts. Neat plug and play alternative to EV conversion.