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High surface area carbon based batteries

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Lead acid batteries have some flaws that prevent them from being used in applications such as electric vehicles. Their low energy densities, problems with corrosion, sulfation, and inability to withstand deep discharges are all major concerns. The advantage that lead acid has over lithium and nickel metal hydride batteries is its affordability. A major reason why lead acid batteries have corrosion and energy capacity problems stems from the composition of the cathode and anode. If the electrodes in these batteries were made of a conductive high surface area carbon, these problems could be resolved. By using extremely high surface area carbon, the capacity and reaction rate should be significantly higher than lead-antimony based batteries, and corrosion should be prevented because the lead will not react with itself (a major contributor to grid corrosion). We are currently researching how to implement the carbon into the cell to maximize the surface area. We are also researching the conductivity of the carbon to see if it should be used as an additive to the grid or as a replacement to the grid. Once a workable prototype has been developed, the battery will undergo a series of preliminary tests. The batteries will be tested for: amp hour capacity, open-circuit voltage, self-discharge rate, discharge rate, and voltage vs. state of charge. This data will be compared to lithium ion and standard lead acid batteries. Once the battery passes the initial tests, further testing of deep discharge tolerance, capacity loss over time, energy density, and economic viability will proceed.