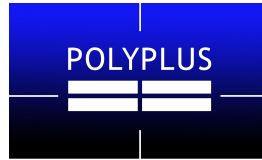


## Rechargeable Lithium-Air Battery Technology based on Protected Lithium Electrodes (PLEs™)

Steven J. Visco, Eugene S. Nimon, and Lutgard C. De Jonghe  
PolyPlus Battery Company, 2431 5th Street, Berkeley, CA 94707

[SVisco@polyplus.com](mailto:SVisco@polyplus.com)



Almost every major automobile manufacturer has introduced a hybrid or all-electric vehicle to the consumer marketplace. Although early adopters have eagerly lined up to purchase EVs, the range limitation dictated by existing battery technologies restricts mass adoption of electrified transportation. Accordingly, there is great interest in next generation battery technology that offers significant reduction in battery weight and volume while satisfying cost and safety requirements. In that vein, in the early 2000's PolyPlus Battery Company invented a breakthrough technology, the water-stable protected lithium electrode or PLE™, that allows the practical development of rechargeable lithium-air batteries. PolyPlus has demonstrated primary lithium-air batteries with specific energy of about 800 Wh/kg and lithium-water batteries at greater

than 1300 Wh/kg. Under ARPA-e funding, PolyPlus is now partnered with Corning Incorporated in the development of rechargeable lithium-air batteries with a target performance of 1000 Wh/l and 600 Wh/kg. PolyPlus has tested developed lithium-air chemistries based on aqueous and non-aqueous catholytes and to date has observed much better performance for aqueous lithium-air cells.

**Cycling Performance of Li/Air Cell With Modified Aqueous Catholyte**

Discharge current density: 1.0 mA/cm<sup>2</sup>  
Charge current density: 0.5 mA/cm<sup>2</sup>  
Charge/Discharge Capacity: 5.0 mAh/cm<sup>2</sup>

