

# Silicon Anode Application

## Coretec

Coretec Endurion provides manufacturing advantages in processing the silicon and silicon/carbon nanostructures needed in today's silicon anodes as a direct replacement for graphite in high energy lithium-ion battery anodes. A key benefit is the potential for superior charge-discharge cycle lifetime and increased energy density.

### Features & Benefits



#### Increased Energy Density

Lower cost and more facile processing yielding silicon nanowires with solution chemistries



#### Enhanced Cycle Life

Compatible with existing active anode materials



#### Faster Charging



#### Ease of Manufacture

Can readily yield silicon nanostructures in solution, be used to make Si/C composites in a single pot, and be implemented into existing PECVD/CVD/ALD processes

### The Challenge

Lithium-ion batteries are a dominant source of energy storage for portable applications ranging from mobile devices to electric car batteries. After years of advances in energy cycle lifetime, cost, and performance, continued market growth remains dependent on further improvements in energy density, while maintaining cost and cycle lifetime.

### The Possibility

Coretec Endurion materials created from a new bottom-up chemical modification to produce a new SEI type of silicon anode fabrication and by replacing the graphite anode commonly used in lithium-ion batteries with pure silicon, silicon-carbon nanocomposites, or alloys, a dramatic increase in energy density can be achieved. Silicon-based materials store more lithium-ions, and when nanostructured reduce the potential for damage due to decreased silicon expansion.

### What Does This Mean?

The increased energy density of the anode enables greater capacity from the same battery size and weight. When optimized with the cathode and electrolyte, silicon anodes used in lithium-ion batteries have an increased potential for fast charging, extended range, and longer cycle life.