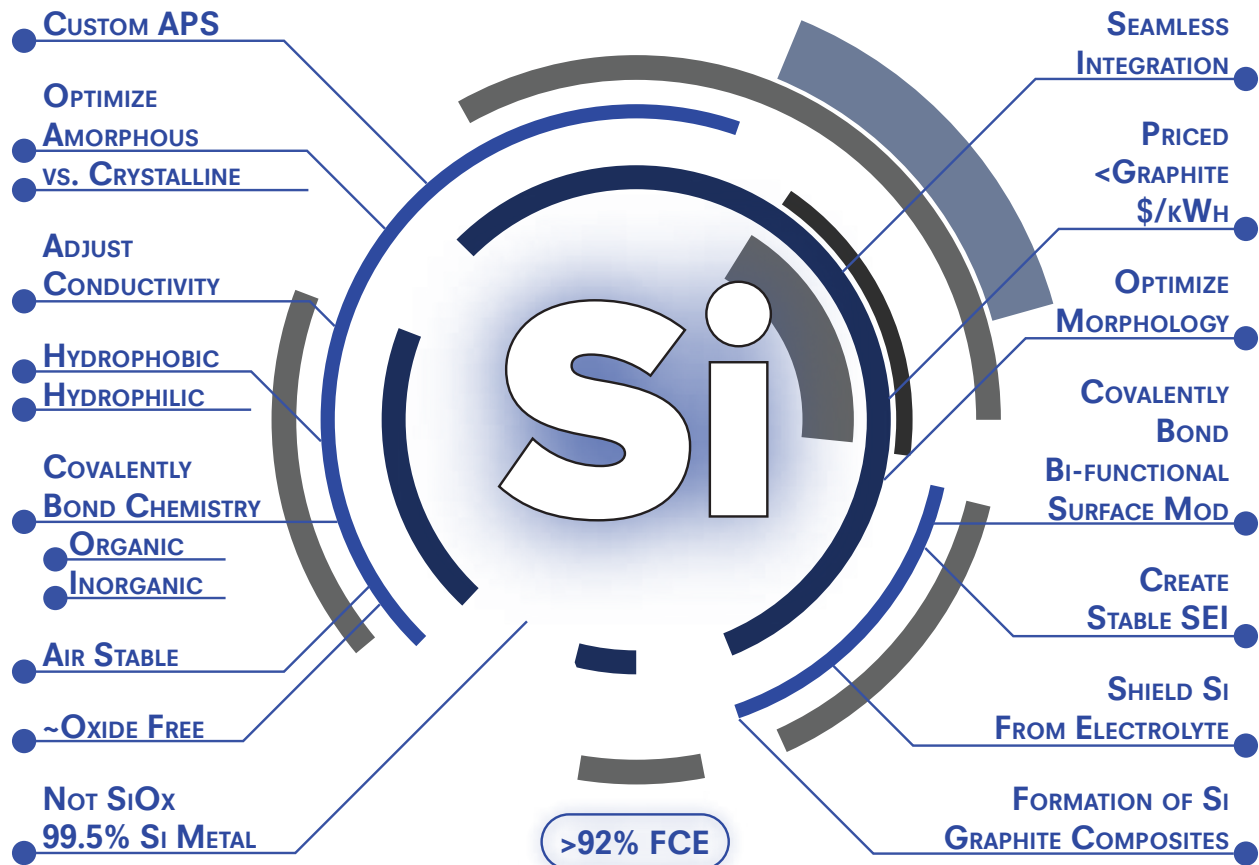


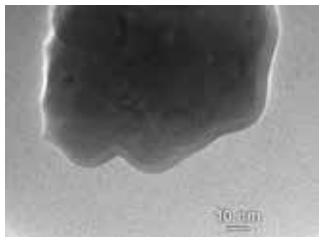
# SM-Architecture™ Enables Commercial Viability of Silicon Metal



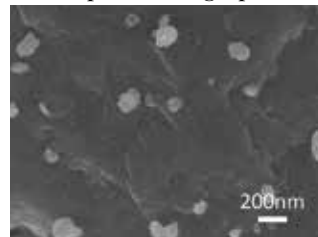
Silicon metal for use in Li-Ion batteries is not yet a one-size-fits-all product. In order to achieve high capacity and cycle stability, there must be a flexible material architecture that allows for extensive optimization of silicon's properties to a battery's specific design and the creation of a sustainable conductive network between all the battery's internal systems.

## SM-Architecture™ enables optimization of SM-Silicon™ material variables.

TEM image showing the outer, artificial SEI, stabilizing shell of SM-Silicon™.

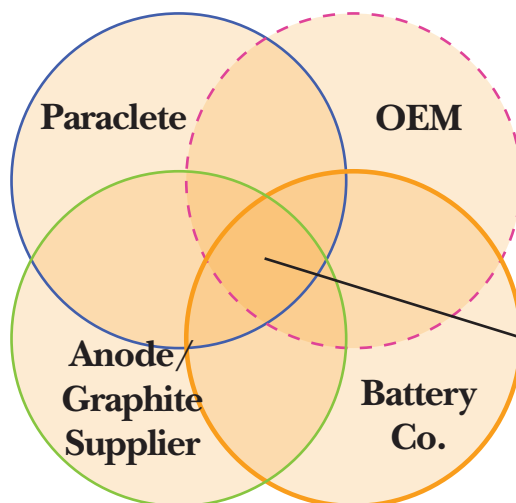


150 nm SM-Silicon™ dispersed on graphite



# Paraclete Energy's Collaborative Business Model

**SM-Architecture™** provides the flexibility and control to manipulate the properties of **SM-Silicon™** so that material variables are enhanced and optimized to a battery's specific design and systems.



*"Coming together is a beginning; keeping together is progress; working together is success."*  
– Henry Ford

**Collaborate in Achieving Mutually Agreed Performance Objectives**

## Examples of Collaborative Business Model Objectives

Percentage SM-Silicon/C™	5%	10%	15%	0% SM-Silicon™
Theoretical Capacity of SM-Silicon™	3,590 mAh/g	3,590 mAh/g	3,590 mAh/g	372 mAh/g
First Cycle Efficiency	88 - 93%	88 - 93%	88 - 93%	88 - 93%
Reversible Capacity (mAh/g)	480 - 521 mAh/g	615 - 683 mAh/g	760 - 843 mAh/g	340 - 360 mAh/g
<b>Energy Density</b>				
Wh/L	650 - 752 Wh/L	718 - 830 Wh/L	770 - 890 Wh/L	534 - 650 Wh/L
Wh/kg	250 - 305 Wh/kg	265 - 320 Wh/kg	273 - 330 Wh/kg	230 - 280 Wh/kg
Ah	6.2Ah	6.2Ah	6.2Ah	
\$/kWh	Same or Less Than Graphite at \$/kWh at Production Quantities >10 Ton/Year			
Cycle Retention	300 - 600 Cycles >80% at 100% DoD with SM-Silicon/C™			
Swelling at the Cell Level	<10%			<10%

## SM-Silicon™ Physical Properties

Form	Amorphous/Crystalline Powder (Customizable)
Purity	≥99.5%
Metals Impurities	<0.5%
APS	150nm (Customizable)
BET/SSA	30 m <sup>2</sup> /g
Tap density	0.8 g / cm <sup>3</sup>
Morphology	Non-spherical (Customizable)

Surface Modifier	Customizable to All Systems & Design of the Battery, e.g. Binder, Carbon, & etc.: Organic, Inorganic or Hybrid. Hydrophobic or Hydrophilic, Single, Bi- or Multi-Functional Covalent Cross Linking, Customizable Conductivity, 0% SiO <sub>2</sub> , Air Stable, Seamless Integration
Price	*Less than Graphite \$/kWh



**SM-Silicon™ The Capacity of Silicon, The Price of Graphite**

Website: [www.ParacleteEnergy.com](http://www.ParacleteEnergy.com)

Email: [Info@ParacleteEnergy.com](mailto:Info@ParacleteEnergy.com)

Phone: 1 734 288 4120