



nexeon®



Unique silicon anode technology
for the next generation of lithium-ion batteries

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The power to make a difference

Rechargeable batteries are a part of everyone's lives today. Getting the most out of our cell phones, laptop computers and digital cameras depends on achieving the highest possible performance from the rechargeable battery packs within.

Few of us haven't been frustrated by flat batteries at critical moments, and we all welcome brighter, more detailed display screens and increased functionality from the devices we carry around with us.

Nexeon's technology is set to make a big difference to the real world performance of these devices, and in turn enhance our personal productivity and quality of entertainment.



Shaping the future of batteries

In the last few years, Li-ion has emerged as the rechargeable battery technology of choice, due principally to its higher performance for a given cell size and weight, its low self-discharge rate and the absence of a 'memory effect'.

Getting more out of Li-ion systems requires a fundamental re-think of the chemistry of the three components of a battery: the anode, cathode and electrolyte. Scientists have long known that **silicon is a far better material** to use in the anode, offering **charge densities of around ten times that of carbon**, the material normally used today. However, use of silicon has been limited due to its physical fragility when repeatedly charged and discharged.

Following a **scientific breakthrough** at Imperial College, London, Nexeon scientists are showing that producing silicon with particular morphologies makes it possible to overcome these limitations of silicon. **Batteries made with silicon anodes have significant performance advantages over their traditional equivalents.**

And since silicon is a higher efficiency material than carbon in this context, smaller amounts are required and costs could be lowered.



Huge global potential

It's not only electronic gadgets that use rechargeable batteries of course. Cordless power tools and even some medical devices require high performance batteries if they are to perform to their maximum capability. Perhaps most dramatically, the development of the 'electric car' is attracting investment from some of the world's largest corporations. Once again, **Nexeon's technology is set to make a major contribution** - allowing more charge and higher currents to be drawn from batteries of a given weight - crucial in automotive applications.

The latest industry estimates ⁽¹⁾ suggest that the global Li-ion battery market is worth around \$8 billion, and is growing fast as more electronic devices are designed, and adopted by an eager public. **Concerns over battery disposal and landfill are favouring replacement of disposable batteries with their rechargeable equivalents.**

The introduction of silicon anodes means avoiding many of the safety concerns associated with operating carbon anodes at close to their maximum capacity.



⁽¹⁾Takeshita



Nexeon – the potential for change

Committed to the development of materials and processes for silicon anode batteries, Nexeon has **invested in extensive research and development facilities**, and in pilot plant to enable it to manufacture test cells under the same conditions as found in commercial battery manufacturing operations.

Nexeon has assembled a formidable team of scientists and engineers, dedicated to optimising their discoveries. Their **world-class scientific knowledge** and applied engineering skills are ensuring that manufacturers can adopt silicon anode technology as rapidly as possible.

Conceived as a **'drop in' approach**, Nexeon's silicon anode systems require only selected parts of the current manufacturing process to be replaced with the more efficient silicon equivalent, potentially speeding up adoption and reducing switching costs.

Nexeon has established a growing portfolio of patents covering materials and fabrication processes, and is building a store of available know-how which is available through licensing.

As Nexeon technology reaches commercial readiness, it has in place the financial resources, scientific knowledge and the managerial skills to deliver performance-enhancing technology to partners in the battery industry.



Nexeon technology – the power to progress

Tomorrow's product designers will have a broader range of options available, as Nexeon's silicon anode technology allows batteries to be designed with higher cell capacities, increased discharge rates, longer cycle life or a combination of these features.

Get in touch.

Contact Nexeon and we will be happy to answer your questions or to arrange a meeting:

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