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AXEON
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DEVELOPMENT OF NEW CHEMISTRIES FOR ELECTRIC VEHICLE BATTERIES

Nearly £1 million of funding has been awarded by the Technology Strategy Board to a consortium led by advanced battery manufacturer Axeon. The partners, who will match the funding, will develop new battery chemistries that will deliver high energy densities, thus making them ideal for use in plug-in electric vehicles (PHEVs).

The £2 million project aims to accelerate the introduction of next-generation batteries that will offer higher energy density combined with lower cost. It will take advanced battery chemistry out of the research laboratory and into a real-world prototype PHEV application and help to consolidate the UK's position as a strategic centre for battery development.

Other members of the consortium include the University of St Andrews, a centre of excellence for energy materials, Nexeon Limited, a UK battery materials company developing silicon anodes for the next generation of Li-ion batteries, and Ricardo, a leading provider of technology and engineering solutions to the automotive and transport industries. Successful delivery of this project will thus further consolidate the UK's position and future as a leading innovator and provider of advanced vehicle battery technology.

Over the next two years St Andrews University will conduct research on potential new electrode materials. Nexeon will implement appropriate chemical engineering to scale-up material synthesis and optimize electrode fabrication resulting in prototype Li-ion cells based on its proprietary silicon anode technology. The cells produced will be used by Axeon to construct a usable, PHEV-type battery, with cells engineered into a housing with electrical interconnects and harnessing. Ricardo will perform extensive testing of the battery module integrated into a demonstrator vehicle platform.

The project will therefore accelerate the knowledge transfer from university-based fundamental research to optimized synthesis and scale up for cell production for use in a demonstrator PHEV battery pack.

Lawrence Berns, CEO of Axeon, noted: "As a leading provider of innovative EV battery technology Axeon is delighted to be leading this consortium. This project will give us access to exciting new chemistries that will enable us to deliver improved PHEV battery solutions for our customers."

Professor Peter Bruce, St Andrews University, said: "New generations of lithium batteries are essential if we are to extend the range of electric vehicles and reduce CO₂ emissions. We are delighted to collaborate with our industrial partners in addressing this key challenge"

Dr Scott Brown, CEO of Nexeon, stated: "This Technology Strategy Board supported project provides an ideal opportunity in collaboration with our consortium members to demonstrate Nexeon's unique silicon battery anode technology in an automotive application and to accelerate progress toward new and improved PHEV batteries".

Roger Thornton, Global Hybrid Product Group Director, Ricardo plc commented: "The development of cost-effective high energy density battery systems will be a crucial enabler for the future commercial realisation of PHEV products. Ricardo is pleased to be able to bring its battery systems development and vehicle integration skills to this important research and demonstration programme."

John Laughlin, the Technology Strategy Board's programme manager for low carbon vehicles, added: "Our support for this project is part of our ongoing major investment programme aimed at putting the UK at the forefront of low carbon vehicle technology. The research we are funding will strengthen the UK's automotive industry, while speeding up the reduction of carbon emissions and helping to meet UK and EU climate change targets. We are delighted to support this exciting project, which brings together some of the UK's world-class expertise in vehicle battery development, and look forward to following its progress."

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About Axeon

Axeon is Europe's foremost producer of Li-ion battery packs and systems for electric vehicles (EVs) and is currently the UK's market leader in large commercial vehicle battery technology. Axeon's automotive battery and charger systems are designed and manufactured to exacting automotive standards, drawing on many years of battery experience. Currently Axeon's EV batteries have a range of up to 140 miles from a single charge and with stored capacity ranging from 5 kWh to 180 kWh.

Axeon's Battery Management System is a market-leading technology for managing lithium-ion batteries, delivering safe, durable performance.

Axeon also designs and manufactures batteries and battery management systems for power tools, enabling new cordless tools that deliver more power with less weight; and mobile power, delivering energy for innovative new products.

Axeon is fully owned by AG Holding Ltd, which is backed by funds managed by Ironshield Capital Management LLP.

For more information, please see www.axeon.com

About Ricardo plc

With technical centres and offices in the UK, USA, Germany, the Czech Republic, China, Japan, India and Korea, Ricardo is a leading independent technology provider and strategic consultant to the world's transportation sector industries. The company's engineering expertise ranges from vehicle systems integration, controls, electronics and software development, to the latest driveline and transmission systems and gasoline, diesel, hybrid and fuel cell powertrain technologies. Its customers include the world's major vehicle, engine and transmission manufacturers, tier 1 suppliers and leading motorsport teams. Ricardo is committed to excellence and industry leadership in people, technology and knowledge; approximately 70 per cent of its employees are highly qualified multi-disciplined professional engineers and technicians. A public company, Ricardo plc posted sales of £197.7 million in financial year 2008 and is a constituent of the FTSE techMark 100 index – a group of innovative technology companies listed on the London Stock Exchange.

For more information, visit www.ricardo.com.

About St Andrews University

The University of St Andrews has one of the UK's top-rated chemistry departments, with proven expertise in materials chemistry especially energy materials and established, world-leading facilities for performing fundamental battery research. They are a member of ALISTORE, the European Network of Excellence on Lithium Batteries and the EPSRC SUPERGEN Energy Storage Consortium.

Prof Bruce is interested in the fundamental science of ionically conducting solids (which includes intercalation compounds and polymer electrolytes), in the synthesis of new materials with new properties or combinations of properties, in understanding these properties and in exploring their applications in new devices, especially energy storage devices such as rechargeable lithium batteries.

Research does not recognise the traditional boundaries between subjects. At St Andrews they combine solid state chemistry, materials science and electrochemistry and by doing so are able to address the exciting scientific challenges that occur in the field of ionically conducting solids.

Although solid state ionics represents the starting point for their research, their interests extend beyond the confines of that subject to include synthesis of new nanomaterials (inorganic nanotubes and mesoporous transition metal oxides), rational synthesis of solids (oxides, sulfides etc) and new crystallographic methods.

Lithium intercalation into solid hosts is the fundamental mechanism underpinning the operation of electrodes in rechargeable lithium batteries. St Andrews seek to synthesise new lithium intercalation compounds with unusual properties or combinations of properties and are especially interested in nanomaterials since the nanoscale can enhance the intercalation properties.

For more information, visit www.st-and.ac.uk

About Nexeon

Nexeon Ltd. ('Nexeon') is a battery materials and licensing company developing silicon anodes for the next generation of lithium-ion rechargeable batteries. A spin out of Imperial Innovations, Nexeon scientists are showing that producing silicon with particular morphologies makes it possible to overcome its limitations as an anode material. Batteries made with silicon anodes have significant performance advantages over their traditional equivalents.

Nexeon is based in Oxfordshire, and has a fully automated and instrumented pilot plant. The pilot plant closely represents a commercial manufacturing facility, and allows an accurate understanding of the processes and costs associated with making anode materials. The technology has been conceived with a 'drop in' approach, requiring the minimum of changes to an existing Li-ion battery manufacturing operation.

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.

For further information please visit www.nexeon.co.uk

About the Technology Strategy Board

The Technology Strategy Board is a business-led executive non-departmental public body, established by the government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve the quality of life. It is sponsored by the Department for Business, Innovation and Skills (BIS).

For further information please visit www.innovateuk.org