

New UK collaboration ICE-Batt to optimise battery technology

- Project aims to improve energy density, power density and low temperature performance of battery technologies through application of innovative carbons

Johnson Matthey (JM), a global leader in sustainable technologies, has teamed up with CPI, an independent technology innovation centre and Thomas Swan, one of the UK's leading independent chemical manufacturers, to explore how to best optimise battery technology. The ICE-Batt project receives funding support from the Faraday Battery Challenge, managed by Innovate UK – the UK's innovation agency – to enable the investigation of how innovative carbon nanotubes (CNTs) and graphene nanoplatelets (GNPs) can improve battery performance. Ultimately this could lead to improvements in energy density, power density and low temperature performance of lithium-ion and beyond lithium-ion technologies. In addition, the project will explore how to improve the green credentials of battery processing.

ICE-Batt will combine Thomas Swan's innovative GNP technology and CPI's formulation expertise to explore how together they can help realise the full potential from JM's high performance battery materials.

The battery market was revolutionised by the advent of lithium-ion technology in 1991. However, today's electrification of the automotive powertrain, driven by our need for improved global air quality, requires constant innovation to meet the public's expectations on range, power and lifetime cost. The ICE-Batt project aims to overcome limitations of lithium-ion batteries, including energy density, power density and low temperature performance through the application of innovative carbons. ICE-Batt will fine tune these novel carbon structures produced at an industrial scale by Thomas Swan and demonstrate how they can be best applied to enhance the overall performance of traditional lithium-ion and next generation batteries such as JM's family of nickel-rich advanced cathode materials eLNO[®] and Life Power[®] LFP.

CPI is a founding member of the UK's High Value Manufacturing Catapult, and will provide formulation optimisation through integration, iteration and evaluation. By using CPI's high throughput capabilities, it offers a rapid route towards improved, safer and more-sustainable technologies in the production of battery cathodes. This will support the shift away from the commonly used – but toxic and now regulated – solvents, improving sustainability and the potential for widespread adoption.

Fine-tuning the existing cathode formulations and introducing advanced carbon nano-materials into them may result in a longer life-span for lithium-ion batteries, which will have widespread economic benefits to society. In this way the ICE-Batt project will help pave the way for the next generation of high-performance, sustainable battery technology.

Dr. Amponsah Kyeremateng, Senior Research Scientist at CPI, said: "The overwhelming global warming issues is such that a widespread adoption of electric vehicles is needed, but we will never get there if we don't have the

right and affordable battery technology. The ICE-Batt project is helping to make this possible, by improving current lithium-ion battery performance while helping to establish the next generation of more sustainable, affordable and efficient battery technology.”

Dr Ross Gordon, Principal Scientist at Johnson Matthey, Project Lead for ICE-Batt, said: “As a sustainable technologies company, JM is committed to applying our knowledge of science and materials to enhance product performance. Innovative carbons are widely reported to enhance the performance of batteries. The ICE-Batt collaboration brings together leaders in their fields to optimise the innovative carbons and understand how best to integrate these with JM battery materials. This project will add to our understanding of how to maximise our battery materials, ultimately benefitting our customers to develop next generation batteries.”

Michael Edwards, Business Director – Advanced Materials at Thomas Swan, said: “We are delighted to be part of the ICE-Batt project, an innovative collaboration in the exciting application of next generation batteries. With patented processes, applied chemistry and modular production capability of GNPs, Thomas Swan brings global expertise in the research, development and production of innovative carbon technologies at an industrial scale. Working with such high-profile, experienced partners as Johnson Matthey and CPI ensures that we continue to drive sustainability by innovating in new carbon-reducing application areas.”

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Notes to Editor

About Johnson Matthey

Johnson Matthey is a global leader in science that enables a cleaner and healthier world. With over 200 years of sustained commitment to innovation and technological breakthroughs, we improve the performance, function and safety of our customers’ products and in 2020 we received the London Stock Exchange’s Green Economy Mark, given to companies that derive more than 50% of revenues from environmental solutions. Our science has a global impact in areas such as low emission transport, pharmaceuticals, chemical processing and making the most efficient use of the planet’s natural resources. Today more than 15,000 Johnson Matthey professionals collaborate with our network of customers and partners to make a real difference to the world around us. For more information, visit www.matthey.com

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About CPI

CPI works with partners to translate inventions into products and processes that enhance health and wellbeing, protect and improve our environment and increase productivity across industries.

With a deep understanding of technology fore-sighting, innovation processes and funding, outstanding technical expertise and industry-relevant assets, we enable the accelerated development of transformational products and processes that have the potential to disrupt and revolutionise markets. We also engage in incremental technological innovation that allows established products and processes to be optimised for better performance and efficient manufacture.

Through the breadth of our technology platforms, we support our partners across many diverse markets, including pharmaceuticals, speciality chemicals, food and drink, electronics and transportation.

www.uk-cpi.com

About Thomas Swan

Thomas Swan & Co. Ltd. was founded in the UK in 1926 and remains an independent family owned and run performance and speciality chemical manufacturing company.

The company turns over approximately £37m per annum, employs 179 people and exports approximately 70% of its products to over 80 countries from its manufacturing headquarters in the North East of England. It has offices in the USA and China.

The business is divided into 3 divisions which include: Performance Chemicals, Custom Manufacture and Advanced Materials.

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