

**Professor Dame Clare Grey, OBE, FRS, Hon DSc, Thursday 18 January 2024 morning ceremony**

Oration given by Professor Caroline Meyer, Pro-Vice-Chancellor (Research)

Vice-Chancellor

Our honorary graduand this morning is an acknowledged international expert in the field of Nuclear Magnetic Resonance (NMR) and its application to battery technology. I am delighted to introduce PROFESSOR DAME CLARE GREY.

Dame Clare is the Geoffrey Moorhouse Gibson Professor of Chemistry at Cambridge. Her work addresses the pressing challenge of climate change – specifically the role that batteries play in achieving carbon neutrality by 2050. For storage and load-levelling on the electrical grid and for transportation, we need new batteries that can be charged and discharged faster and store more power than those currently available. Clare has pioneered the optimisation of batteries using NMR – giving non-invasive insight into the inner workings of batteries. She has worked particularly on rechargeable lithium-ion batteries – which supply the power to mobile phones and e-vehicles – and their potential for use in energy storage applications that benefit the environment. These in-situ NMR studies allow monitoring at atomic resolution of the chemical changes that occur during a battery's operation, enabling scientists to follow reactions between the electrolyte and the electrode materials and to investigate the effect of rapid charging and cycling of the battery. Clare's NMR work has also clarified the properties of several technologically important materials, and has helped to increase significantly the performance of lithium-ion batteries; her work has introduced them for use in combination with new renewable energy sources and to the field of transportation, and she is currently testing wider applications of the technology. Clare has been instrumental in the development of new types of batteries – including lithium-air batteries – and is also researching batteries for the forthcoming 'beyond lithium' era, using more environmentally friendly sodium instead of lithium. The start-up company, Nyobolt, which she co-founded, is pioneering fast-charging battery systems.

Clare is one of the absolute leaders in her field, a role model for future scientists, in particular for women. She was one of the first female undergraduates at Christ Church, Oxford, and the first woman to be Head of Inorganic Chemistry at Cambridge. She has given expert advice at the highest level: in 2022, she was special adviser to the House of Lords' enquiry into batteries for Net Zero, and in 2023 co-chaired the UK Battery Strategy Taskforce which informed the government's Battery Strategy (published in November). She also engages brilliantly with the public: in 2018, she was interviewed on Radio 4's Life Scientific and her videos are models for making science accessible to the non-scientist. Her work has been recognised by a raft of awards and prizes, including the Royal Society Davy Award (2014) for pioneering applications of solid state NMR, and the Hughes Award (2020) for contributions in the field of energy, the Royal Society of Chemistry John Goodenough Award (2019), the Richard R. Ernst Prize in Magnetic Resonance (2020), and in 2021, the Körber European Science Prize . She was elected a Fellow of the Royal Society in 2011, and was made a Dame of the British Empire in 2022.

And Clare is no stranger to Warwick. Part of her doctoral research (1987-91) was done under the supervision of Professor Ray Dupree of our Physics Department, with an important part of her research carried out here at Warwick. More recently, she has been an active user of the UK High-Field-Solid-State NMR Facility based in our Millburn House Magnetic Resonance Centre. It is a pleasure to welcome her back today.

Vice-Chancellor: in the name of the Senate, I present to you for admission to the degree of Doctor of Science, honoris causa, PROFESSOR DAME CLARE GREY.