

Tales of invention

The milestones in rechargeable lithium-ion battery development have been widely reported but the first-hand accounts from inventors have often not been. We aim to bring their personal stories to wider attention with a new article series.

Since the long-overdue announcement of the Nobel Prize for the development of lithium-ion batteries in 2019, there has been wide coverage of the birth of this wonder technology. For many, especially those working in energy storage, the history of rechargeable lithium-ion batteries is not exactly a mystery. However, most accounts of battery inventions tend to be second-hand and focus only on technical aspects. What is often missing is the first-hand narrative from the original inventors describing their motivations and inspirations, their successes and failures along the way, and the broad context for their work. In a new series in *Nature Energy* — entitled Tales of Invention — we invite battery pioneers to share with our readers their personal reflections and unique insights on their discoveries.

To kick start the series, our February issue presents the [story of the invention](#) of lithium titanium disulphide (TiS₂) cathodes from M. Stanley Whittingham. Recalling the challenges that battery developers faced in the 1970s, the Nobel Laureate recounts the development of the TiS₂ battery in his lab, along with the subsequent commercialization efforts, the challenges encountered and even the failure of the first practical lithium battery. He also reflects on a number of fascinating firsts in electrochemical research that resulted from the discovery of TiS₂ cathodes.

The next instalments in this series will be accounts from two other Nobel Laureates. John B. Goodenough (and his protégée Arumugam Manthiram) will tell us how no battery company was interested in the patent on lithium cobalt oxide cathodes at the time of the invention. Yet ironically this proved one of his many great inventions that went on to find huge success in powering portable electronics. Akira Yoshino, on the other hand, will explain how basic exploratory research in Asahi Kasei Corp. allowed him to embark on a journey from exploring polyacetylene — a plastic that was entirely unrelated to batteries — to carbonaceous anodes and eventually a prototype of the contemporary lithium-ion battery.

There are many key milestones along the road to today's commercial lithium-ion batteries. Sadly, we cannot cover all of them. As such, this series aims to present invention stories of some of the most representative battery components. In particular, we will try to focus on those that have had large-scale commercial success.

While we intend to hear directly from original inventors, this may not be guaranteed in all cases. For example, there have been over 4,000 patents alone on nickel–manganese–cobalt lithium-ion batteries, given the enormous commercial

interest and extensive research on the ternary cathode. The tale of this invention will therefore be told by two pioneers and major contributors to the field. We also take this opportunity to call upon other pioneers and major contributors who may want to join us in this effort and make their own contributions.

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We hope that this series will allow general readers in the wider energy community to understand the historical development of some of the most fascinating battery components and concepts. At the same time, we also hope that readers — and especially early-career researchers — can draw inspiration from the inventors’ first-hand reflections on these instrumental discoveries in ways that might benefit their own work. □

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