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Letter to the Editor

Chemical Landmark Award for basic research on the lithium-ion battery

The Royal Society of Chemistry has introduced a Chemical Landmark Award Scheme whereby a plaque is awarded to sites or buildings in the UK where major breakthroughs in chemical science have been made. These may be either fundamental advances in chemical knowledge, or new applications of chemistry that have made a significant contribution to the health, wealth or quality of life of the nation. The plaques, when mounted, draw public attention to the location and to the significance of the chemical research undertaken there and are intended to awaken public interest in historic developments in the chemical sciences. In some ways, the scheme is analogous to the historical blue plaques that indicate places where famous personages had been born or had once resided.

Over 30 plaques have been awarded since the Royal Society of Chemistry's initiative commenced in 2001 and a number of them are clustered in the Thames Valley region, a notable centre of scientific research. The latest award was presented to the Inorganic Chemistry Laboratory of the University of Oxford on November 30, 2010 – the fourth to be presented to the University. The event has provided a lasting recognition of the important breakthrough in the electrochemistry of the lithium-ion battery that was made there in the late 1970s by Professor J.B. Goodenough and his colleagues, K. Mizushima, P.C. Jones and P.J. Wiseman. Their basic research on the mechanism of the insertion of lithium ions into oxide structures led to the identification of lithium cobalt oxide ($LiCoO_2$) as the preferred positive electrode material for use in rechargeable batteries. The work also introduced and substantiated the idea of assembling lithium batteries in the discharged state, thereby avoiding the need to handle lithium metal foil under an inert atmosphere in dry glove-boxes, an important practical consideration. The key research paper was published in the *Materials Research Bulletin*, 15 (1980) 783–789 and the work was funded in part by the US Air Force and in part by the European Commission as one of its very early sponsorship programmes.

The findings of the Goodenough group were taken up by SONY who developed the first commercial lithium-ion batteries. Subsequently, many other companies adopted the technology and the ensuing activity has resulted in the present-day situation where most portable electronic devices incorporate lithium-ion batteries. They are also being evaluated for use as traction batteries for electric vehicles. Without these batteries, mobile phones, lap-top computers and 3G devices with high performance would not be available today. Sanyo predicts a tripling of the Li-ion market to $60b by 2020.

The epochal work by the Goodenough group also led to a proliferation of research on all aspects of lithium-ion batteries, especially on alternative and cheaper positive electrode materials. Many of these studies have been published in the *Journal of Power Sources*.

This award was the first Landmark to recognise an advance in electrochemical power sources, and is well-merited for the major benefits that Li-ion batteries have brought to society.

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