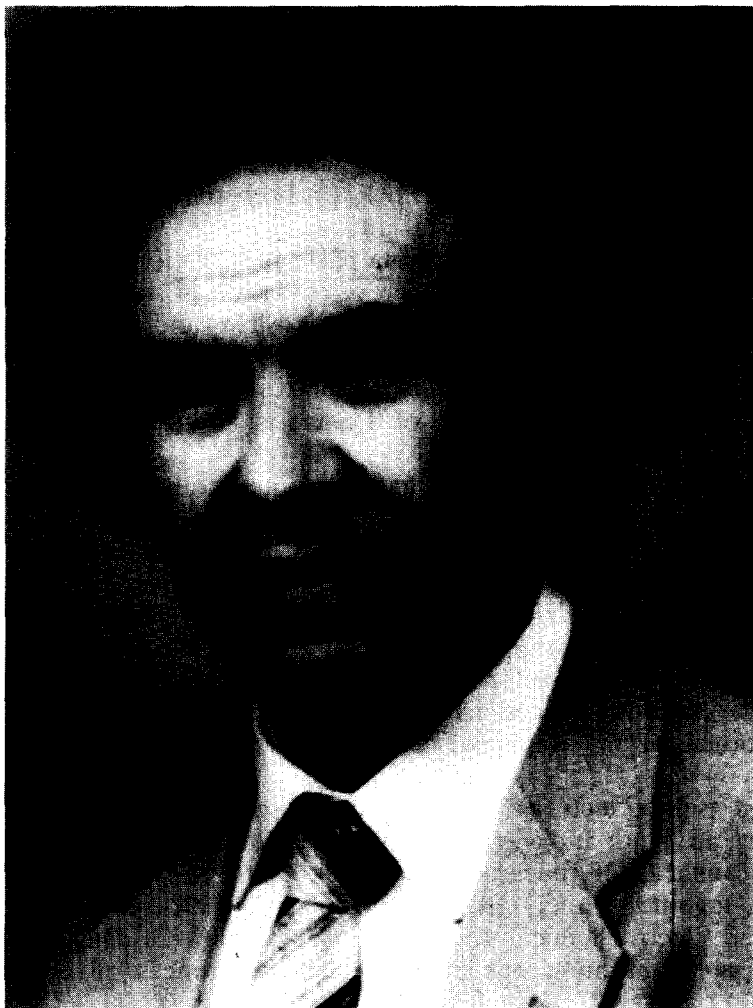


## Professor Detchko Pavlov – The 1994 Gaston Planté Medallist

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Professor Detchko Pavlov

Detchko Pavlov was born on the 9 September, 1930, in the small town of Shipka in Central Bulgaria. He graduated from the Higher Institute of Chemical Technology in Sofia with a degree in electrochemistry. On the proposal of Professor St.G. Christov, a prominent Bulgarian scientist, Dr Pavlov joined the staff of the Institute as an assistant in physical chemistry; a position that he subsequently held for 8 years.

When the famous Bulgarian scientist in the field of crystal growth, Professor R. Kaishev, founded the Institute of Physical Chemistry at the Bulgarian Academy of Sciences, he invited Dr Pavlov to serve as a research scientist in the Department of Electrochemistry. At this time, Dr Pavlov started investigations on the anodic processes that take place on lead electrodes immersed in  $H_2SO_4$  solution. In 1967, together with Professor E. Budevski, Dr Pavlov established the Central Laboratory of Electrochemical Power Sources. Since the inception of this organization, he has been the founder and head of the Department of Lead/Acid Batteries. The latter has developed gradually into a team of talented scientists. In 1970, Dr Pavlov was promoted to senior research scientist and, in 1984, he obtained a D.Sc. degree.

In 1986, Dr Pavlov was elected Professor of Chemical Sciences, and since 1989, he has been a Member of the Bulgarian Academy of Sciences.

Professor Pavlov has now been working in the field of lead/acid batteries for over 30 years. He has published, alone or with co-authors, more than 120 scientific papers in either international journals or the proceedings of international conferences. In particular, Professor Pavlov is the author of the notable chapter on 'Lead/Acid Batteries' in the definitive treatise *Power Sources for Electric Vehicles*, edited by B.D. McNicol and D.A.J. Rand and published by Elsevier Science S.A. The works of Professor Pavlov are widely cited in the world literature.

Professor Pavlov's scientific endeavours are aimed principally at the development of a theory of lead/acid batteries, especially with respect to the processes that occur during their manufacture. His major scientific contributions have included the following.

- Discovery that, in the potential region between the equilibrium potentials of the Pb/PbSO<sub>4</sub> and PbO<sub>2</sub>/PbSO<sub>4</sub> electrodes, a third electrode system, viz., Pb/PbO/PbSO<sub>4</sub>, is formed.

- Demonstration that the Pb/PbO/PbSO<sub>4</sub> system has photo-electrochemical properties.

- Establishment of the fact that the PbSO<sub>4</sub> layer formed on the Pb/PbSO<sub>4</sub> electrode behaves like a semi-permeable membrane, as a result of which the solution in the pores is alkalized.

- Disclosure that electrochemically obtained PbO<sub>2</sub> (in both the anodic corrosion layer and the lead dioxide active mass) is composed of both crystal and gel zones.

- Identification of the processes that occur during paste preparation, especially the conditions of 4BS paste formation, and elucidation of the mechanism of oxidation of 4BS crystals to PbO<sub>2</sub> agglomerates.

- Explanation of the zone processes on formation of positive and negative active masses, as well as of the mechanism of these processes.

- Description of the skeleton and agglomerate structures (together with the gel and crystal zones) that comprise the lead dioxide active mass, and of the energy and skeleton structures of the lead active mass.

- Elaboration of a model for the phenomena that cause premature capacity loss and the advancement of methods for suppressing these phenomena.

In 1980, Professor Pavlov was granted a scientific award by the Australian–European Committee for a 2 month stay in Australia as an invited lecturer at Flinders University. In 1983, he was invited by the Organization of American Countries to present a course of lectures at the São Paulo University in São Carlos, Brazil. In 1984, the Battery Division of the American Electrochemical Society honoured Professor Pavlov with its research award for fundamental contributions to understanding the mechanisms of the processes that take place in the lead/acid battery. In 1986, Professor Pavlov received the 'Dimitrov Prize', a Bulgarian National Award, for major contributions to the development of the science of lead/acid batteries.

Professor Pavlov has presented lectures on the theory and technology of lead/acid batteries in Australia, Brazil, China, Germany, Finland, India, Japan, Russia, South Korea, Sweden, Taiwan and the USA. He chaired the International Conferences on Lead–Acid Batteries: LABAT '89 and LABAT '93; and acted as Co-Chairman, together with Dr K.R. Bullock, of the 1984 conference on lead/acid batteries that was organized by the Electrochemical Chemical Society in New Orleans, USA. He has also delivered keynote lectures and papers at numerous international conferences on electrochemistry and power sources.

By virtue of his active research activities, Professor Pavlov is acknowledged as a scientist of world reputation, particularly in the development and fundamental understanding of the theory of lead/acid batteries.