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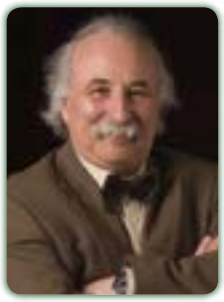

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Implantable biofuel cells operating *in vivo*-potential power sources for bioelectronic devices

Implantable devices harvesting energy from biological sources and based on electrochemical transducers are currently receiving high attention. The energy collected from the body can be utilized to activate various microelectronic devices. This presentation is an overview of the recent research activity in the area of enzyme-based biofuel cells implanted in biological tissue and operating *in vivo*. The electrical power extracted from the biological sources presents use for activating microelectronic devices for biomedical applications. While some microelectronic devices can work within a fairly broad range of electrical operating conditions, others, such as pacemakers, require precise voltage levels and voltage regulation for correct operation. Thus, certain classes of electronic devices powered by implantable energy sources will require careful attention not only to energy and power considerations but also to voltage scaling and regulation. This requires appropriate interfacing between the energy harvesting device and the energy consuming microelectronic device. The lecture focuses on the problems in the present technology as well as offers their potential solutions. Lastly, perspectives and future applications of the implanted biofuel cells are also discussed. The considered examples include a pacemaker and a wireless signal transfer system powered by an implantable biofuel cell extracting electrical energy from biological sources.

Biography

Evgeny Katz received his PhD in Chemistry from Frumkin Institute of Electrochemistry (Moscow), Russian Academy of Sciences, in 1983. He was a senior researcher in the Institute of Photosynthesis (Pushchino), Russian Academy of Sciences, in 1983-1991. In 1992-1993 he performed research at München Technische Universität (Germany) as a Humboldt fellow. Later, in 1993-2006, he was a Research Associate Professor at the Hebrew University of Jerusalem. From 2006 he is Milton Kerker Chaired Professor at the Department of Chemistry and Biomolecular Science, Clarkson University, NY (USA). He has (co)authored over 440 papers in peer-reviewed journals/books with the total citation more than 30,000 (Hirsch-index 84). His scientific interests are in the broad areas of bioelectronics, biosensors, biofuel cells, and biomolecular information processing.

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