

Microbial Fuel Cell



Technology Brief

In an era of climate change, alternate energy sources are desired to replace oil and carbon resources. Subsequently, climate change effects in some areas and the increasing production of biofuels are also putting pressure on available water resources. Microbial Fuel Cells have the potential to simultaneously treat wastewater for reuse and to generate electricity; thereby producing two increasingly scarce resources. While the Microbial Fuel Cell has generated interest in the wastewater treatment field, knowledge is still limited and many fundamental and technical problems remain to be solved.

Microbial Fuel Cells utilise microbial communities to degrade organics found within wastewater (and theoretically in any organic waste product); converting stored chemical energy to electrical energy in a single step. Murdoch University is currently optimising the control and regulation of the anode chamber and is investigating bacterial electron-transferring and proton-transferring mechanisms. Murdoch's research team comprising Prof Goen Ho, Dr Ralf Cord-Ruwisch and PhD candidate Ka Yu Cheng achieved in 2007, power densities in excess of 1500 W/m³; exceeding the highest reported values in the literature at that time in a similar reactor scale.

Murdoch University is currently seeking interested partners for research collaborations to capitalise on the excellent results that this research team are achieving.

Research Team/Track Record

Professor Goen Ho is professor of Environmental Engineering at Murdoch University and has been involved in this field for in excess of 20 years, including being instrumental in the development of the Environmental Science curriculum at Murdoch University. Professor Ho has an extensive record of publication with more than 250 international referred journal articles and conference papers. His research interests lie in waste management and pollution control. As the founding director of the Environmental Technology Centre (ETC) at Murdoch University, the ETC has been recognised as a centre of excellence and is a partner centre for the Asia Partner region of the United Nations Environment Programme International Environmental Technology Centre. The ETC aims to to develop and diffuse environmentally sustainable technologies.

Dr Ralf Cord-Ruwisch is a senior researcher and lecturer with Murdoch University, with current research interests in Industrial Microbiology and Environmental Biotechnology. With over 20 years of research experience, Dr Cord-Ruwisch is a named inventor on several pending patents and is well published in his field.

Dr Cord-Ruwisch was also instrumental in setting up the Centre of Excellence for Organic Waste Management (COWM) at Murdoch University and under his direction as Director from 2006, it has developed from simple waste management to an environmental biotechnology

and bioprocessing centre, with a high-tech laboratory and expertise capable of providing services to industry, CRC and Government.

Research candidate, Ka Yu Cheng has already published several papers in this field and has recently been awarded the inaugural Huber Technology Prize, offered by water and wastewater treatment equipment supplier Huber Technology. The prize honours ideas, concepts and results of research that are an innovative contribution to the reuse of energy and valuable materials from wastewater.

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