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Low temperature and high efficiency biomass fuel cell and bio-hydrogen production

A novel fuel cell which can directly use native polymeric biomasses, such as starch, cellulose, lignin, and even switchgrass and wood powders will be discussed. This fuel cell combines some features of solar cells, fuel cells, and redox flow batteries. Specifically, the polyoxometalate which is used as catalyst which forms a charge transfer complex with the biomass by either absorbing solar light or heat energy. The power density of the solar-induced hybrid fuel cell powered reached ~ 50 mW/cm². Unlike most cell technologies that are sensitive to impurities, the cell reported in this study is inert to most organic and inorganic contaminants present in the fuels. The fuel cell is completely noble metal free. The similar system was investigated for low temperature hydrogen production using native biomass directly.

Biography

Yulin Deng has received his PhD from Manchester University, UK in 1992. He has worked as a Post-doctoral Research Fellow at McMaster University in Canada, and then was appointed as an Assistant Professor at the Institute of Paper Science and Technology (IPST) in 1995. He was appointed as an Associate Professor at Georgia Institute of Technology in 2003, and promoted as a Full Professor in 2008. He is a Fellow of the International Academy of Wood Science, a member of ACS, AIChE and TAPPI. He has received AIChE Chase Award in 2013. He is an Associate Editor of 2 journals, and serves as the Editorial Board Member for five journals. He has published more than 200 peer reviewed papers covering biomass, biofuel, fuel cell, nano-science and nanotechnology, and nano-electronics.

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