Printed Biofuel Cells

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Technology description

University researchers have developed printed biofuel cells (BFCs) and methods whereby such BFCs can be fabricated on various substrates using high-throughput, low-cost printing, roll-to-roll, and inkjet techniques. Proprietary printing techniques and chemical functionalization of the inks are employed to realize robust, high-power output, and inexpensive biofuel cells that can process a wide variety of biofuels. The technology has wide-ranging implications in the healthcare and power generation domains, e.g., low-cost power sources for implantable/body-worn medical devices; low-cost systems for energy generation in remote, developing areas. Reduction to practice has been achieved for an exemplary embodiment of the invention.

The fuel cell has been considered a clean alternative to fossil-fuel-based power generation. Conventional fuel cells, however, are large solid-state devices that employ costly mechanical and chemical components and have thus witnessed very limited commercial adoption since their introduction several decades ago. Further, such devices use inorganic fuels, many of which produce substantial carbon footprints when processed and refined. Biofuel cells (BFCs) derive power from organic/biological compounds; e.g., glucose (in blood), lactate (in perspiration), and urea (in urine, wastewater, sewage) - and represent a new, compelling class of energy conversion devices. BFCs have the ability to operate under mild conditions and are envisioned to be applicable as implantable power sources.

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