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A REMARKABLE SYNERGIC EFFECT OF POLY (ACRYLIC ACID) HYDROGEL ANCHORED Pd CATALYSTS IN FORMIC ACID ELECTROOXIDATION REACTION

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ABSTRACT

Polymer-based catalysts have never been used before as anode catalysts in direct formic acid fuel cells. At present, Poly (acrylic acid), Poly (AA) was prepared and electrodes were constructed on graphite pencil (G) from these hydrogels. Furthermore, Pd doped Poly (AA)/G electrodes were prepared by employing electrodeposition techniques, and their formic acid electrooxidation (FAEO) activities were examined via cyclic voltammetry, chronoamperometry, and electrochemical impedance spectroscopy. These electrodes were characterized by DT-TGA, FTIR, and SEM-EDX. It was observed that Poly (AA)/G were prepared successfully. Poly (AA)/G electrode exhibited promising electrocatalytic activity as a DFAFC anode catalyst. By the modification with Pd, the FAEO activity increased for Poly (AA)/G with 38 mA/cm² current density, greater than literature values. In conclusion, it is clear that these Pd doped Poly (AA)/G electrodes have superior activity towards formic acid electrooxidation.

Keywords: Formic acid, electrooxidation, Pd, Poly (acrylic acid), electrodeposition