Preparation and Characterization of Polyaniline / Glassy Carbon Modified Electrode as an Electrocatalyst for the Production of Hydrogen from Et$_3$NHCl/[Bu$_4$N][BF$_4$]-CH$_3$CN Solution

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Crystalline, porous and fibril-like structure polyaniline film is electrodeposited on glassy carbon electrode from acidic solution. The electrochemical behaviour of polyaniline/glassy carbon modified electrode in [Bu$_4$N][BF$_4$]-CH$_3$CN solution is investigated using cyclic voltammetry technique. It shows a stable electroactive region which is related to the semiconducting state of polyaniline in nonaqueous medium. The electro-catalytic performance of the modified electrode toward Hydrogen Evolution Reaction (HER) from Et$_3$NHCl/[Bu$_4$N][BF$_4$]-CH$_3$CN solution shows a positive shift in the direct proton reduction potential as well as a higher catalytic reduction current density compared to the unmodified electrode with a good stability of 73.7 % current retention after 25 repetitive cycles. The electrocatalytic activity of the modified electrode is correlated to its morphology.

Keywords: polyaniline, Hydrogen Evolution Reaction, electrocatalysis, cyclic voltammetry, surface characterization

FULL TEXT

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