

Hydrogen Evolution in Mixed Acids: A Quantitative Mechanistic Study

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The hydrogen evolution reaction (HER) remains a central challenge to implement green hydrogen as a substitute for fossil fuels. Several studies of its kinetics using platinum as catalyst and performed in strong acidic media suggest that its mechanism characteristics and efficiency are intimately related to its media. Consequently, the media effect that could arise from weak acids can be the key to generate green hydrogen more efficiently. However, to study the weak acid media effect on HER, a main problem must be dealt with, as for instance, the acetic acid dissociation is hardly 0.4%. So weak acids don't provide enough protons (hydronium) to be consumed as substrate of HER. To tackle this problem a traditional undergrad experiment which combines hydrochloric and acetic acids was used to observe the change in HER's behaviour as a function of substrate concentration, and consequently the strong, weak or middle ground acidic media. To accurately evaluate the reaction efficiency as a function of the media, the catalyst turnover frequency was used.^{1,2}

Acknowledgments:

Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

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