

**PERFORMANCE EVALUATION OF ELECTROLYTE CONCENTRATION
AND OPERATING PARAMETERS FOR ENHANCED OXYHYDROGEN
PRODUCTION VIA ALKALINE ELECTROLYSIS**

By

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12118005

BACHELOR'S DEGREE
in

SUSTAINABLE ENERGY AND ENVIRONMENT
LIFE SCIENCE AND TECHNOLOGY



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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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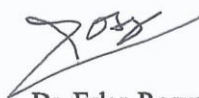


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ABSTRACT

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Oxyhydrogen (HHO) gas, produced through alkaline electrolysis, presents as an alternative fuel to curb Indonesia's transportation-related emissions. This study evaluates the effects of potassium hydroxide (KOH) concentrations (5%-25%) and applied currents (5A-30A) on HHO productivity, electrolyte temperature, onset time to achieve a stable 2:1 composition ratio, cell efficiency, and verification of HHO gas composition. Results presented that HHO gas flow rate increased with increasing currents and KOH concentrations, peaking at 1.46 LPM at 20% KOH 30A, while the electrolyte temperature rose accordingly. The onset time for a stable 2:1 composition ratio decreased with increasing current and concentration, revealing a minimum of 5.7 minutes at 25% KOH and 20 A. Gas composition verification through GC-TCD closely matched real-time measurements at a condition of 10% KOH 5A, resulting in a similar 2:1 composition ratio. Maximum efficiencies are observed at moderate currents and concentrations, with diminishing returns observed at higher levels. Optimal operating conditions were defined as 5A for 5%-15% KOH, 10A for 20% KOH, and 5A for 25% KOH, based on peak efficiencies, temperature (<60°C), and the fastest onset time.

Keywords: Oxyhydrogen (HHO) production, Alkaline Electrolysis, Performance Evaluation



DEDICATION

To Mami and Papi, who never saw me as a failure, but always offered endless love and unwavering support, reminding me gently that I was—and always will be—
enough.

To Salma, Cia, Cung, Rifa, Jovina, and Vina, whom I never imagined calling sisters, yet who stood by me wholeheartedly, believing in us as we pursue our dreams
together.

To my aunt, Poppy, who taught me the true meaning of determination and showed me to embrace the courage to be different, as long as it is true to myself.

To Mika and Icha, who believed in me when no one else did, offering strength and hope from the very beginning of my journey.

To God, who is ever-present, to lift me and provide me the strength to continue walking even in the darkest moments.

Moreover, finally, to myself, who at times felt the urge to surrender, yet chose instead to persevere, to give my best, and to trust that everything will unfold as it is meant to be.

.

ACKNOWLEDGEMENTS

First, all glory and honor to the Lord Almighty, the foundation of all the pinnacle of my achievements. Without His presence, following my dreams would have been impossible.

To my advisor, Prof. Dr. Hery Sutanto, I am grateful to have been your student. Your belief and trust in my potential have been the source of my confidence. Although the topics you taught early in my bachelor's program were not my expertise, you constantly challenged my abilities beyond my limits, for which I am forever thankful.

A debt of gratitude is owed to the Energy Conversion and Conservation Research Laboratory, BRIN, for accepting me as a thesis student. Conducting research here has been invaluable, strengthening my commitment to contributing to a sustainable future. My growth is primarily due to the unwavering support and guidance provided by my supervisors and colleagues. I especially appreciate:

- Dr. Erlan Rosyadi, for his invaluable guidance and mentorship throughout this project. His dedication and relentless curiosity inspire me to keep growing.
- Kak Rian, for his supervision and patient guidance. His expertise has been instrumental in helping me maximize my potential and overcome challenges.
- Pak Kiki and Pak Trisno, for their support and assistance with lab instruments. They have been incredibly helpful throughout the research.
- The entire research group warmly welcomed me.

Finally, no words can adequately express my gratitude to my loving parents for their unwavering support and prayers. To Ma'am Evita, who encouraged me to continue this research. To my friends whose companionship made my university life youthful and memorable (you know who you are). Moreover, to myself, for remaining content and proud, in every difficult moment, especially throughout this arduous journey.

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