Combustion of ammonia and hydrogen fuel mixtures in marine engine

Introduction

This Ph.D. is part of the HYDROGENi project (https://hydrogeni.no/).

alignment with international maritime In organization zero emissions target, the need for alternative renewable fuels is increasingly vital. Hydrogen and ammonia with should be a solution for decarbonisation the marine sector. Ammonia may be thought of as a hydrogen vector, essentially a molecularly bound method to store and transport hydrogen.

To utilise ammonia as a fuel it may need to be mixed with hydrogen to ensure efficient and complete combustion.

Primary objective

- Design a new pre-chamber to use in an optical engine to ignite ammonia.
- Determine suitable fuel mixtures for high efficiencies and low emission.

Secondary objectives

Develop an LCA model to evaluate the environmental impact of the system.



Duc Duy Nguyen

Affiliation(s): Norwegian University of Science and Technology Related projects: FME – HYDROGENi Supervisor: David R. Emberson (NTNU) Co-supervisor: Eilif Pedersen, James W.G. Turner (KAUST)

I originally had a career in industry, spending 5 years working as project engineer. Before moving to NTNU, I have served as a graduate researcher at the CCRC at KAUST in Saudi Arabia, and KIMM in Korea. Master's degree hold а in Mechanical Engineering from University Science of and Technology in Korea.



Estimated progress of the PhD project:

Just started	< 50 %	> 50 %	Almost done 🕲

Publications

- · Ducduy Nguyen, et al. "Life cycle assessment of ammonia and hydrogen ..." International Journal of Hydrogen Energy (2025).
- Ducduy Nguyen, and James WG Turner. "Towards carbon-free mobility: ..." International Journal of Engine Research (2024)
- Renston, JF, Ducduy Nguyen, et al. "Advanced Biomass Conversion...", SAE 2024-01-2449
- Ducduy Nguyen; et al. "Pre-Chamber Ignition...". EPHyC (2024)

Institute for Fnergy Technology







Norwegian Research School on Hydrogen and Hydrogen-Based Fuels



Norwegian Centre for Environmentfriendly Energy Research

"ଅଟି HYDROGENi

SINTEF