

## Popular science summary of the PhD thesis

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| PhD student             | Chong Cheng   |
| Title of the PhD thesis | Simulation and experimental investigation of methanol and ammonia/n-heptane fuel combustion process in compression-ignition engines |
| PhD school/Department   | DTU Construct   |

### Science summary

In order to reduce the dependence on fossil fuels such as diesel and petrol and to reduce CO<sub>2</sub> emissions, this thesis has investigated the use of methanol and ammonia/n-heptane fuels in compression combustion engines. Methanol fuels can be produced using carbon dioxide in a power-to-X method, thus achieving carbon neutrality. Ammonia fuel has no CO<sub>2</sub> emissions during combustion.

In this work, this methanol combustion was investigated by means of experiments and simulations. Parameters of the methanol combustion process in the engines, such as heat release rate, cylinder pressure, fuel evaporation process, cylinder temperature, and so on, were analyzed by developing innovative models. The methanol combustion process was simulated, and the type of combustion was analyzed for both light and heavy-duty engines.

For ammonia fuel/n-heptane, a dual-fuel combustion process, an injection combustion model for n-heptane and a flame propagation model for ammonia was developed. The combustion process parameters were analyzed, such as heat release rate, cylinder pressure, indicated efficiency, etc. This thesis aims to explore the combustion process of methanol and ammonia fuels in compression ignition engines for future applications.

Please email the summary to the PhD secretary at the department