Carbon2Chem®

eMethanol Car

Pioneering a New Era of Climate-Positive Driving

OBRIST DE GmbH | TU Dresden | TU Munich | RWTH Aachen University

Objective

The objective of the Carbon2Chem® eMethanol Car project is to proof the usability of CO_2-neutral methanol from industry waste gases in passenger vehicles. Within this project OBRIST Group developed a 2-cylinder methanol engine and built up 10 vehicles. TU Dresden is responsible for testing and tuning the engine. The vehicle level tests are done at the RWTH Aachen. TU Munich is performing fuel compatibility tests with different blends of methanol with gasoline.

Key challenge

The main challenge within this project is to proof the compatibility of materials and components with methanol and different fuel blends. Furthermore, several issues like methanol engine cold start strategies and tests are developed as well as a clean burning process.

The goal is to combine all aspects learned during development and to define lasting material for methanol usage, e. g. for the fuel system. Due to the less volatile characteristics of methanol the cold start of the engine is one big challenge regarding fuel injection and ignition. The clean burning is mandatory to meet the Euro 7 requirements as well as possible formaldehyde regulations.

To further lower the CO_2 emissions, different vehicle operation strategies are developed and tested. As the vehicles are serial prototypes it is possible to use all benefits given by the system to lower energy consumption and therefore exhaust gases

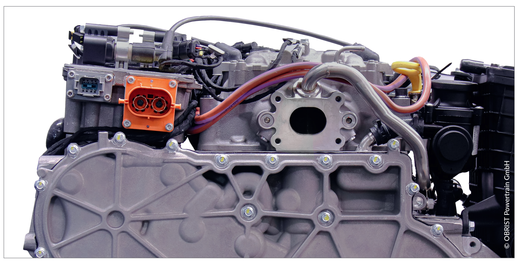
Conclusion

The result of the ongoing project already shows promising results regarding the different research fields mentioned in the key challenges. As of today, the cold start strategies developed by TU Dresden show positive results as well as the injection system is further improved to achieve an even better result. More improvements are done to the engine to ensure a cleaner and stable burning process.

The engine tests on the testbed show a power increase compared to the same engine with gasoline. Theses initial tests show a high potential of improvements. Further updates will be done to raise the engines efficiency even higher.

Daily use tests are regularly performed with the prototype vehicles to proof the concept of the methanol serial hybrid system. With the current methanol tank system, the vehicles range (battery size: 12,3 kWh) can be quintupled. This range is currently only limited by the fuel tanks rather small size of 40 l. The vehicles are prepared for the upcoming WLTC and RDE test. The results will help sophisticate the cars further.

One of 10 prototypes by OBRIST, this Tesla Model Y converted to a plug-in hybrid runs on eMethanol.



2-cylinder methanol engine used in the tests.

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A KEY BUILDING BLOCK FOR THE CLIMATE PROTECTION

CO_2 reduction by cooperation of process industrial sectors