

## **Ceramic hollow fiber membranes for the efficient separation of water contained in diesel fuel**

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Diesel fuel contaminants include abrasive dust, water droplets, rust and organic materials. Water in diesel fuels can cause engine part corrosion and erosion, fuel lubricity deterioration, fuel pump cavitation, fuel injector deposit build-up and fuel filter plugging. Water (as free water, emulsified water and dissolved water) commonly enters the fuels via precipitation, humidity, and condensation of atmospheric moisture. With the standard DIN EN 590 for diesel fuel in 2010, its interfacial tension was rapidly decreased by additives and biodiesel. Currently, the major challenge for conventional water separation systems is the much more stable water-in-diesel emulsions with lower volumetric diameters of water droplets ( $\leq 10$  microns), resulting out of the composition of diesel fuel. World Fuel Charters recommends a maximum water content to be less than 200 ppm.

The goal of this study is the development of an efficient membrane-based process, which enables selective separating of water drops. In this context, the application, characterization and performance of hydrophobic/hydrophilic ceramic hollow fiber membranes with different properties for efficient separation of water from Ultra Low Sulfur Diesel (ULSD) was investigated. The experimental results showed the ceramic membranes are able to remove water from diesel fuel with water removal efficiencies reaching  $> 95\%$ .

In order to detect the effectiveness of the separation of water directly and in real time, another objective of this project is to develop a new water-in-oil online monitoring sensor. This will be achieved by project partner DECKMA Hamburg GmbH, Hamburg, Germany.