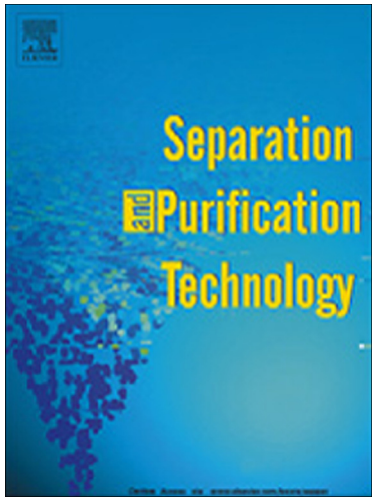

Performance of Hydrophilic Glass Fiber Media to Separate Dispersed Water Drops from Ultra Low Sulfur Diesel Supplemented by Vibrations

Xi Yang, Hua Wang, George G. Chase

PII: S1383-5866(15)30312-9
DOI: http://dx.doi.org/10.1016/j.seppur.2015.10.062
Reference: SEPPUR 12666

To appear in: *Separation and Purification Technology*

Received Date: 14 July 2015
Revised Date: 21 October 2015
Accepted Date: 27 October 2015

Please cite this article as: X. Yang, H. Wang, G.G. Chase, Performance of Hydrophilic Glass Fiber Media to Separate Dispersed Water Drops from Ultra Low Sulfur Diesel Supplemented by Vibrations, *Separation and Purification Technology* (2015), doi: http://dx.doi.org/10.1016/j.seppur.2015.10.062

Performance of Hydrophilic Glass Fiber Media to Separate Dispersed Water Drops from Ultra Low Sulfur Diesel Supplemented by Vibrations

Xi Yang, Hua Wang, George G. Chase
Department of Chemical and Biomolecular Engineering,
The University of Akron, Akron, OH 44325-3906

Abstract

Separation of dispersed water droplets in diesel fuel has received attention in the automotive, aviation, and petrochemical industries. In fuels, especially diesel, water causes corrosion of sensitive engine parts, promotes microbial growth, and can plug injection systems. In this work, we use glass fiber coalescing filters augmented with vibrations to separate the water drops from Ultra Low Sulfur Diesel. As a water-diesel emulsion enters a fibrous filter, the water droplets can be captured or filtered by the fibers. Ensuing droplets carried by the diesel collide with the prior droplets and coalesce to form larger drops. Externally generated vibrations promote the aggregation of water drops on the fibers and the subsequent release of enlarged drops, thus improving the fibrous fiber filtration efficiency. This work discusses fabrication, characterization, effects of vibration direction, and experimental results. Water separation experiments showed that glass fiber mats improved water separation by vibration, especially at frequency 100 Hz in the horizontal direction, with water removal efficiencies reaching beyond 95%, as compared to efficiency of about 69% for glass fiber media without vibration.

Keywords: hydrophilic, filter media, glass fibers, diesel, vibration