

## **Water-in-oil Coalescence using Layered Hydrophilic/Hydrophobic Fiber media**

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### **Abstract**

The coalescence filtration using fibrous filter media is a well-known approach for separation of water from liquid fuels. Wettability of the filter media has significant influence on the water removal efficiency which makes it one of the important parameters in designing a filter media. The wettability of the filter media is mainly governed by surface properties of fiber materials and porosity of filter medium. The surface properties of filter media can be expressed in terms of hydrophilic or hydrophobic nature of the filter media. The filter media with varying wetting properties can be prepared by using different compositions of hydrophilic and hydrophobic fibers. The wettability of filter media can be characterized using Modified Washburn's equation which is based on capillary rise phenomena and the concept of *Lipophilic* to *Hydrophilic* (L/H) ratio.

The filter media composed of thin layers of micro-glass (hydrophilic) fibers and polypropylene (hydrophobic) fibers were prepared with different compositions of hydrophilic and hydrophobic fibers to achieve media with range of wetting properties and characterized using Washburn's technique. The Viscor Oil-1487 and water are used as reference liquids in the Washburn's characterization. The effect of porosity and permeability on the wettability of filter media can be analyzed. The liquid-liquid coalescence filtration experiments can be carried to measure the effect of wettability on filter performance. The work will have great impact on automotive, aviation and petrochemical industry and also contribute in further research.

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Education – Graduate Student, The University of Akron (Since January 2007)

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Conference Papers Published-

P. S. Kulkarni, K. Moorthy, B. Newby, G.G. Chase, Separation water from Viscor oil -1487, Produced Water Society Seminar 2008, Nassau Bay, Texas.

P. S. Kulkarni, G.G Chase, Wettability Characterization of Mixed hydrophilic/hydrophobic fiber media using Modified Washburn's Equation, Produced water society Seminar 2009, Nassau Bay, Texas.