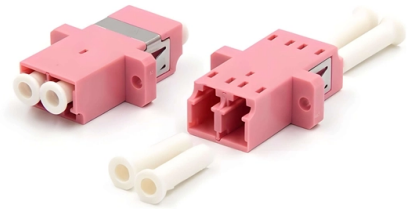
Fiber Optic Sensor for Viscosity Measurement



Overview

A sensitive fluid viscosity and flow measurement device using optical intensity based sensing is presented. The sensing principle makes use of the damping characteristic of a vibrating optical fiber probe with approximate hinge-free end configuration. Gomes, Jens Kobelke, Jörg Bierlich, Kay Schuster, Hartmut Bartelt, and Orlando Frazão A. Frazão, "Optical Fiber Probe for Viscosity Measurements," in 26th International Conference on Optical Fiber Sensors, OSA Technical. Previous studies of optical viscosity sensors were conducted by using different optical sensing methods. The proposed optical viscometer consists of an LPFG sensor, a temperature-controlled chamber, and a cone-shaped reservoir where gravitational force could cause fluid to flow through the. An all-fiber-optical method is presented to monitor densities, viscosities, and temperatures of Newtonian liquids.

Article Content

Optical fiber-based fluorescent viscosity sensor

Covalently bound molecular rotors exhibit a viscosity-dependent intensity increase similar to molecular rotors in solution. An optical fiber-based fluorescent viscosity sensor may be used in real-time

Distributed viscosity and flow velocity measurements using a fiber ...

Density and viscosity are two key parameters that govern process mechanisms. The possibility to measure transient processes over longer distances is desirable. We present a novel

(PDF) Liquid Viscosity Measurement Using a Vibrating Flexure Hinged ...

A novel viscosity measurement system based on a miniature 3D printed parallelogram flexure hinge structure and a fiber optic sensor is developed. Lorentz forces are applied to excite the structure

All fiber-optic viscosity, density, and temperature measurements of ...

An all-fiber-optical method is presented to monitor densities, viscosities, and temperatures of Newtonian liquids. The actuation is performed by photothermally heating the base of

U-shaped optical microfiber-based liquid viscosity measurement

The sensor comprises a U-shaped optical microfiber encapsulated in a PDMS film. Under identical motion speeds in liquids with different viscosities, the optical microfiber bends to varying

(PDF) Fibre optic sensor based viscometer to measure

PDF | In this work we report a fiber optic sensor to measure the viscosity of Newtonian liquids. The sensor is made of a rectangular channel and

Fiber Optic Assisted Optofluidic Viscometer for

An optofluidic device is developed using optical fibers to measure biofluids viscosity via amicrofluidic channel and experimentally validated in the

Optical fiber sensor for water velocity measurement in rivers and ...

In this work, optical fiber Bragg grating sensors were used to measure water velocity and examine how it was distributed in open channels.

Optical Fiber Probe for Viscosity Measurements

An optical fiber probe was developed for viscosity measurements. The sensor acts as a two-wave interferometer, sensible to the position of the fluid inside the cavity. Viscosity is measured through

Viscosity measurement using fiber bend loss sensor

A fluid viscosity sensor using bend loss theory is presented. The sensing principle makes use of the damping characteristic of a vibrating optical fiber probe with fix-free end configuration. By

An Optical Fiber Viscometer Based on Long-Period

This work addresses the development and assessment of a fiber optical viscometer using a simple and low-cost long-period fiber grating (LPFG)

untitled [acoustic.tju .cn]

Liquid Viscosity Measurement Using a Vibrating Flexure Hinged Structure and a Fiber-Optic Sensor Jinyu Ma, Xinjing Huang, Hyungdae Bae, Yelong Zheng, Cong Liu, Meirong Zhao, and Miao Yu

A Comprehensive Review on Real-Time Viscosity and Density Measuring Sensors

In recent years, the identification of fluid density and viscosity has gained substantial significance across a wide range of industries and scientific fields. These parameters are of utmost

Fiberoptic sensor for flow and viscosity measurement

The viscosity is determined by measuring the vibration of a sinusoidally excited optical fiber. The sensor exhibits an excellent sensivity for measuring the viscosity.

All fiber-optic viscosity, density, and temperature ...

In this work, we introduce a sensor that simultaneously monitors liquid viscosity, density and temperature using an all-fiber-optical excitation and detection scheme.

(PDF) Optical fiber-based fluorescent viscosity sensor

An optical fiber-based fluorescent viscosity sensor may be used in real-time measurement applications ranging from biomedical applications to the

Fibre optic sensor based viscometer to measure viscosity of Newtonian ...

In this work we report a fiber optic sensor to measure the viscosity of Newtonian liquids. The sensor is made of a rectangular channel and two separate multimode optical fibers, which are

An Optical Fiber Viscometer Based on Long-Period Fiber Grating ...

This work addresses the development and assessment of a fiber optical viscometer using a simple and low-cost long-period fiber grating (LPFG) level sensor and a capillary tube mechanism.

Distributed viscosity and flow velocity measurements using a fiber ...

We present a novel distributed shear stress sensor that allows to derive fluid rheological parameters such as the viscosity along a fiber-optic cable being exposed to a moving medium.

Distributed viscosity and flow velocity measurements

A novel viscosity measurement system based on a miniature 3D printed parallelogram flexure hinge structure and a fiber-optic sensor is developed.

Optical Fiber Probe Viscometer Based on Hollow Capillary Tube

We developed a miniaturized optical fiber probe capable of providing an optical interferometric measurement of the viscosity of small volumes of a liquid viscous medium (less than

Fiberoptic sensor for flow and viscosity measurement

A novel optical viscosity sensor using forward light scattering is presented. The sensor concept is based on the fact that the frequency response of a fiber partially submerged in a fluid...

Application and development of optical-based viscosity measurement ...

Optical-based viscosity measurement technology has demonstrated excellent performance at both macro and micro levels because of its suitability for low sample volumes and the advantages

Fiber optic sensor for flow and viscosity measurement

A sensitive fluid viscosity and flow measurement device using optical intensity based sensing is presented. The sensing principle makes use of the damping characteristic of a vibrating optical fiber

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