

## Phase Detection Using Infrared Spectroscopy: A Build up to Inline Gas-Liquid Flow Characterization

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**Abstract :** The characterization of multiphase flow has gained enormous attention for most petroleum and chemical industrial processes. In order to fully characterize fluid phases in a stream or containment, there needs to be a profound knowledge of the existing composition of fluids present. This introduces a problem for real-time monitoring of fluid dynamics such as fluid distributions, and phase fractions. This work presents a simple technique of correlating absorbance spectrums of water, oil and air bubble present in containment. These spectra absorption outputs are derived by using an Fourier Infrared spectrometer. During the testing, air bubbles were introduced into static water column and oil containment and with light absorbed in the infrared regions of specific wavelength ranges. Attenuation coefficients are derived for various combinations of water, gas and oil which reveal the presence of each phase in the samples. The results from this work are preliminary and viewed as a build up to the design of a multiphase flow rig which has an infrared sensor pair to be used for multiphase flow characterization.

**Keywords :** attenuation, infrared, multiphase, spectroscopy

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