



Characterization of Water/Oil/Gas Emulsions and Foams Using Low Field Nuclear Magnetic Resonance

Milad Saidian, Ahmad A. Abdul Majid, Manika Prasad, and Carolyn A. Koh

Summary: A method to characterize the emulsion properties in oil and gas producing wells at downhole condition or pipelines

Description: A method to measure the bubble/droplet size distribution in oil and gas producing wells and pipelines for flow assurance, fluid property analysis, and production evaluation using low field Nuclear Magnetic Resonance (NMR) has been developed. In this method, multiple Diffusion-Transverse Relaxation (T_2) or Diffusion-Longitudinal Relaxation (T_1) measurements are required to calculate the average surface relaxivity. Comparison of the measured T_1 and T_2 spectra and diffusion coefficient at downhole conditions with the bulk responses of the constituent fluids determines the dispersed and continuous phases, droplet/bubble size distribution, and pressure-volume-temperature properties (e.g., bubble point and viscosity) of the produced oil.

Main Advantages of this Invention

- Characterization of fluid in on-shore and subsea pipelines, which can lead to a better understanding of the possibility of hydrate formation
- Characterization of production fluid at downhole conditions for oil and gas producing wells
- Allows for an evaluation of the oil, water, and gas production from each perforation in a wellbore

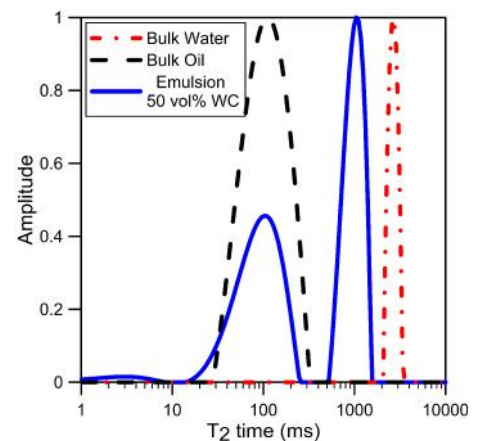
Potential Areas of Application

- Oil and Gas Industry
- Medical MRI applications

ID number: 15025

Intellectual Property Status: US provisional patent 62/154,638.

Opportunity: We are seeking an exclusive or non-exclusive licensee for implementation of this technology.



T₂ measurement of bulk oil, bulk water and a synthetic water/oil emulsion

For more information contact:

William Vaughan, Director of Technology Transfer
Colorado School of Mines, 1500 Illinois Street, Guggenheim Hall Suite 314, Golden, CO 80401
Phone: 303-384-2555; e-mail: wvaughan@mines.edu