# ROCK-ON-A-CHIP

## ENERGY & ENVIRONMENT

Nanofluidic device for measuring fluid thermodynamic and fluid transport properties in a low-permeability rock structure, providing a cost-effective, efficient diagnostic tool for drilling decisions.

## TECHNOLOGY TYPE

**Oil & Gas**  
Nanotechnology  
Nanofluidics

## STAGE OF DEVELOPMENT

Prototypes developed.

## IP PROTECTION

**PCT Pending**  
Nanofluidic devices for measuring the thermodynamic fluid and transport properties in shales.  
*WO2018085782A1*

## LEARN MORE

**Reference Number:**  
U-6212

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## TECHNOLOGY SUMMARY

Extraction of oil and natural gas is time consuming and costly. Behavior of fluids and gases in nanometer-scale pores of reservoir rocks can have a strong functional dependence on the pore size and surface chemistry. As such, oil and gas companies rely on advanced imaging techniques and computer generated models to determine how oil is flowing. These simulations, unfortunately, do not reflect real-world properties and characteristics of reservoir rocks.

*Rock-On-A-Chip* transforms traditional reservoir characterization methods by using physical models to refine computer simulations. Subsurface geology is replicated on a chip or wafer and then tested using real oil to simulate the effect of channel shape and dimensions on relative permeability. The rock-on-a-chip is connected to a fluid flow system and visualization set-up to simulate frac-fluid and water transport, CO₂ flooding, and sequestration. This improves oil extraction methods and allows oil and gas companies to drill more effectively, which reduces their environmental footprint.

## FEATURES AND BENEFITS

- Provides more realistic patterns of the nanoscale qualities of low permeability rocks improving Digital Rock Physics (DRP) simulations.  
- Enables controlled experimentation through nanoscale feature replication of pore physics and thermodynamic properties on a wafer.  
- Maximizes reservoir extraction efficiencies.  
- Increases environmental safety.

## RECENT PUBLICATIONS


## INVENTOR PROFILE

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