

**Call for application for research scholarships
for post-graduate international candidates**

RESEARCH PROJECT N. 66

Title

Microfluidic approach to enhanced oil recovery

Scientific responsible (name, surname, role)

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Short description of the research activity (max 250 words)

Microfluidic devices and their application to lab-on-a-chip is one of today's fastest growing technologies. It has been successfully applied in several fields, like medicine and biology, as it can combine a number of materials and fluids, and define different flow geometries.

Microfluidic devices could also be a breakthrough technology in the field of petroleum engineering. Thanks to the possibility of designing tortuous paths for fluid flow, functionalizing the microchannel surfaces and directly inspecting the phenomena taking place in the experimental set-up, microfluidic devices could be an excellent technology to study enhanced oil recovery methodologies. In fact, they can be designed to mimic the flow paths existing in hydrocarbon-bearing porous and permeable rocks. The research would imply to carry out lab experiments to assess the displacement efficiency of oil when using enriched water as the displacing fluid under different temperatures and pressure conditions. Water would be enriched with different types of polymers, surfactants or other chemicals and its displacement efficiency under the temperature and pressure conditions typically found in hydrocarbon reservoirs. Observations with a microscopy and IR will allow to gain an insight of the phenomena occurring at the micro scale.

The research would greatly improve the knowledge of enhanced oil recovery and the understanding of the fluid and solid-fluid interactions, currently one of the key aspect under investigation worldwide.

Specific requirements (experiences, skills)

Preferably MSc Degree in Chemistry or in Petroleum Engineering. In either case the candidate should have a good knowledge of fluid flow phenomena in hydrocarbon-bearing porous media, enhanced oil recovery processes, hydrocarbons classification and properties, oil composition and chemical classification, effect of sulfur, nitrogen and oxygen compounds in oils.

Website of the research group (if any)

www.polito.it/petroleum

Keywords (min 3, max 6)

Microfluidics, EOR, petroleum

Research Area (max 1)

Energy