

# Researchers first in the world to discover the age of oil

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University of Alberta geologists have become the first in the world to find a means of accurately determining the age of oil, providing critical information about its formation which will ultimately aid in a better understanding of oil deposits.

Today, Dr. David Selby and Dr. Robert Creaser published a paper in the highly-regarded journal *Science* which states that the giant oil sand deposits in Alberta formed 112 million years ago - not 60 million years ago, as previously thought.

The isotope geochemists have used the isotopes of two elements found in trace amounts in oil - rhenium and osmium - to accurately pinpoint when oil formed in the western Canada sedimentary basin, which contains much of the world's oil sands.

"This is the first time that anyone has ever directly determined an age from oil," explained Creaser, who heads up the U of A's Radiogenic Isotope Facility and is funded by a discovery grant from Science and Engineering Research Canada (NSERC).

"Previously, the time at which oil was produced from a rock and migrated as a fluid could be deduced from looking at the geologic relationships, looking at the overall history of that sedimentary basin and things like that. But this is the first time there's actually been a direct determination using any isotopic method to try to figure out how old it is."

Isotopes - versions of elements with different atomic masses - can be used to determine the age of substances. The isotopic method used by Selby and Creaser, for instance, is comparable to carbon-dating, in which the rate of decay of a carbon isotope is used to determine the age of organic matter. Using a mass spectrometer, which analyzes the molecular composition of a sample, the researchers spent nearly an entire year examining rhenium and osmium isotopes in large volumes of oil - a meticulous process, says Creaser.

Both researchers emphasized that the research findings will change the way geologists understand the evolution of the basin, which runs from Fort McMurray and surrounding area through to Peace River. But while the discovery has drawn much media attention, they stress that the discovery will not immediately help geologists find new sources of oil.

"It's probably not going to help anyone tomorrow find more oil," said Creaser.

Selby, the paper's lead author, emphasized that the finding answers one question, but that many others remain.

"It's part of the puzzle. We need to study the sedimentary basins in detail from a lot of different angles. But this is one angle that we've never been able to assess before, and now we can - so, it's a pretty big step forward in that regard," said Selby, an Alberta Ingenuity Fund Postdoctoral Fellow, who is funded also by the American Chemical Society.

"Until now, understanding when oil was formed and moved was all relative, which is why it was a debate with the tar sands - did it happen 60 million years ago, did it happen 100 million years ago? And that's a 40 million year difference, which is a huge amount of time. So with this method, we get an absolute number and that helps resolve some of the questions, and [geologists] can take this information and reevaluate what

they already know."

Source: University of Alberta

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