



Caesium

# Caesium: Lithium's little brother with big potential

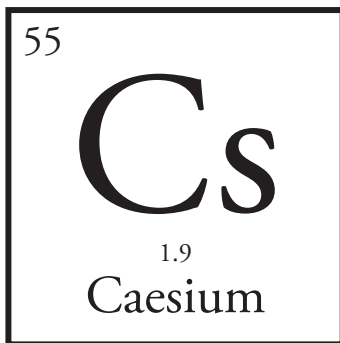
COMMODITY CAPERS: Some may consider it this to be an extremely tenuous connection, but the recent lithium bubble possesses a startlingly similarity to the whaling industry of old.

A PRIZED FIND WHEN OPENING up a whale in the olden days would be the discovery of ambergris, a solid, waxy, substance produced in the digestive system of sperm whales, which was highly-valued by perfumers as a fixative that allowed a scent to last much longer.

The present day mineralogical equivalent of ambergris may be, for lithium explorers, a discovery of caesium-hosting pollucite as they harpoon their lithium pegmatite-populated tenements with drill rigs.

Pollucite is a rare mineral of caesium that forms only in extremely differentiated zones of rare-metal lithium-caesium-tantalum (LCT) pegmatite systems.

Caesium Formate, the main downstream product of pollucite, is a high-density fluid that looks very much like water, possessing the same viscosity, but is much denser.



It is mostly commonly used in high-temperature/high-pressure drilling by the oil & gas industry in the form of caesium formate brine as it reduces oil well intervention risks while also maximising production life and durability of the well.

For the scientifically minded



among us — caesium formate brine is generally formulated with acid-soluble calcium carbonate particles and formation-friendly polymers to make low-solids drilling fluids, which can also be used as lower completion and screen-running fluids.

Breaking it down to more simpler terms — caesium formate provides well-documented benefits such as minimal damage to the hydrocarbon-bearing formation resulting in higher production rates.

It acts as a lubricant, is non-corrosive and is considered a benign chemical when compared to alternatives.

At present, the main producers of caesium are the Tanco mine owned and operated by Cabot Corporation in Canada and the Bikita Mine in Zimbabwe.

The Tanco mine is an underground caesium and tantalum mine, located on the north west shore of Bernic Lake in Manitoba, which

Cabot claims to host the largest known deposit of pollucite, making it the world's largest producer of caesium.

Although it is most commonly used in oil & gas drilling, Cabot says caesium formate brine has been successfully field proven in over 350 applications.

“It has been used successfully in high-pressure high-temperature (HPHT) fields at temperatures as high as 235°C/455°F and pressures up to 1,126 bar/16,331 psi with no fluid-related well control incidents ever,” Cabot claims on its web site.

“Its unique properties deliver a number of benefits, which make it ideally suited for clear-brine applications.”

According to Cabot, high-density caesium formate brine has been used as a completion fluid in hundreds of wells globally.

The company references a 2015 study by well engineering consultancy



Ridge AS of 89 North Sea wells, which concluded that, “formate fluids outperform other fluids to deliver significant rig-time savings for both openhole and cased and perforated completions by enabling more time-efficient solutions”.

“With its high thermal stability and ability to protect downhole metals against corrosion, caesium formate brine is exemplary for well suspensions, even in HPHT environments,” Cabot states.

“It has been used in numerous operations worldwide at temperatures up to 235°C/455°F, including suspensions of 15 months’ duration with no adverse effects on downhole metals.”

The capability of high-density caesium formate brine to create hydrostatic pressure provides it with the ability to lower differential pressure across sealing elements and on wellbores and casings to prevent collapse while also protecting metals from corrosion.

“Formate brines have been used as packer fluids in numerous wells from the Gulf of Mexico to the North Sea, including one documented case of formate brine left downhole for six years under pressures of 965 bar/14,000 psi and temperatures of 177°C/350°F,” Cabot explains.

“When the production string was finally pulled from the hole it was in excellent condition—even the

identification markings on the pipe were intact.”

Hoping to join the ranks of global caesium producers is Western Australia-based lithium exploration play Pioneer Resources (ASX: PIO), which has encountered what it considers to be potentially economic pollucite mineralisation at the company’s Pioneer Dome lithium-caesium project, located in the Goldfields region of Western Australia.

Drilling carried out by Pioneer in 2016 returned an intersection of 6m of high-grade caesium grading 27.7 per cent caesium oxide (Cs<sub>2</sub>O) from 47m, which at the time the company said was likely to be in the form of pollucite.

“Drill intersections of this grade and width are extremely rare; a literature search has identified less than five occurrences globally where caesium occurs at this grade and down-hole width,” Pioneer said at the time.

This was followed up late in the year with a further strongly mineralised caesium intersection, of 7m at 16.2 per cent Cs<sub>2</sub>O from 47m and 6m of 1.65 per cent lithium oxide (Li<sub>2</sub>O) from 56m, which Pioneer declared to and confirm an extension to the pollucite mineralisation encountered by the initial discovery hole.

Pioneer completed nine drill holes displaying visual evidence of having intersected the lens of high-value

caesium mineralisation—considered most likely to be pollucite—over a strike length of approximately 60m.

Mineralisation remains open to the south, trending into an area where Pioneer considers additional caesium geochemistry anomalies to be present.

“The Pioneer Dome joins the ranks of a small group of extraordinarily differentiated pegmatite systems in the world,” Pioneer Resources managing director David Crook told *The Resources Roadhouse*.

“Pollucite is currently only found in significant amounts in three places in the world—that we know of—Tanco, Bikita, and now the Pioneer Dome.”

The Caesium Formate market is quite unique—so much so that it is difficult to get a complete handle on pricing, however there is some thought that a price of around \$25,000 per tonne is not out of the question.

That makes the caesium market an extremely boutique market that could be very profitable for an exploration company looking to fund future activities.

Should Pioneer be able to work up a modest Resource of say, around 10,000 tonnes of high-grade pollucite, which could yield upwards of 3,000t of Caesium Formate, that could become a very worthwhile project to develop into, what could potentially be, a highly profitable revenue stream. 📌