New mineral with strange chemical signature discovered in a diamond by UAlberta student

A new and curious mineral has been discovered by University of Alberta PhD student Nicole Meyer. The mineral—named goldschmidtite in honour of the founder of modern geochemistry Victor Moritz Goldschmidt—has an unusual chemical signature for a mineral from Earth’s mantle.

“Goldschmidtite has high concentrations of niobium, potassium, and the rare earth elements lanthanum and cerium, whereas the rest of the mantle is dominated by other elements, such as magnesium and iron,” explained Meyer, graduate student in the Diamond Exploration Research and Training School, part of NSERC’s Collaborative Research and Training Experience. “For potassium and niobium to constitute a major proportion of this mineral, it must have formed under exceptional processes that concentrated these unusual elements.”

Because it is so difficult to access the mantle, scientists rely on tiny mineral inclusions within diamonds to learn more about Earth’s chemistry deep beneath the surface.

“This discovery is the result of a lot of patient and meticulous work by Nicole and the research team,” said Graham Pearson, Meyer’s co-supervisor. “Goldschmidtite is highly unusual for an inclusion captured by diamond and gives us a snap-shot of fluid-processes that affect the deep roots of continents during diamond formation. There have been several attempts to name new minerals after Goldschmidt, but previous ones have been discredited. This one is here to stay.”

Meyer is studying under the supervision of Thomas Stachel, professor and Canada Research Chair in diamonds and Pearson, professor in the Department of Earth and Atmospheric Sciences, Henry Marshall Tory Chair, and Canada Excellence Research Chair Laureate.

“The work that goes into finding a new mineral is not done by one person,” said Meyer. “It has been an interdisciplinary collaboration with a mineralogist Andrew Locock, crystallographers from Northwestern University, my advisors Thomas and Graham, and technicians.”


This is the second new mineral discovered by DERTS graduate students this year. Nixonite was discovered by master’s student Garrett Harris. The paper, “Nixonite, Na₂Ti₆O₁₃, a new mineral from a metasomatized mantle garnet pyroxenite from the western Rae Craton, Darby kimberlite field, Canada,” was published in American Mineralogist (doi: 10.2138/am-2019-7023).

Source: Faculty of Science