Other asteroids contributed elusive olivine to Vesta

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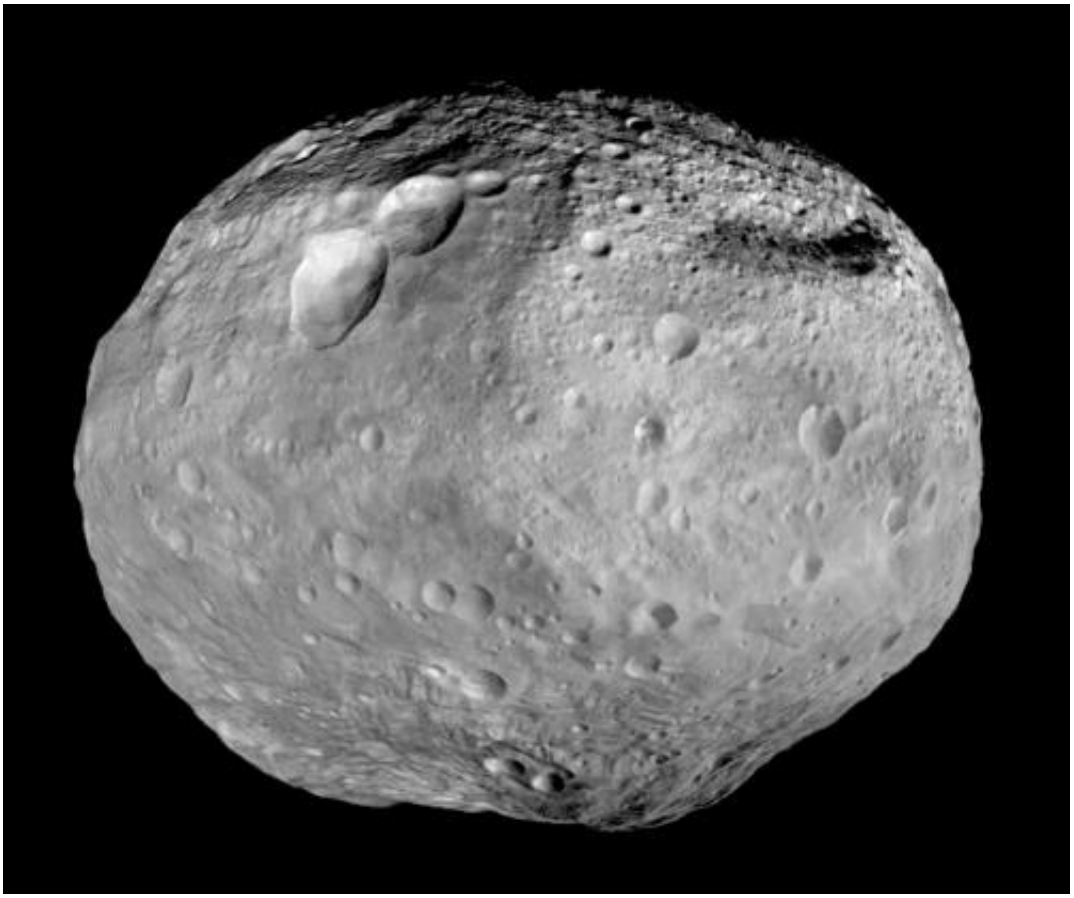

Asteroid Vesta. Credit: NASA/JPL-Caltech/UCAL/MPS/DLR/IDA

Olivine should be one of the most abundant minerals on asteroid Vesta, but it remains elusive. Scientists working on NASA's Dawn mission to Vesta were initially thrilled to find few scattered remains of this

enigmatic mineral as evidence for telltale signs of planetary differentiation. However, a new paper in the journal Icarus says that at least some of this olivine might not have come from Vesta, but instead was delivered by other asteroids.

"Olivine provides important constraints on how small protoplanets like Vesta form and what we can learn about the formation of terrestrial planets, including Earth, but what we see on Vesta might not be the smoking gun we were looking for," said Planetary Science Institute researcher Lucille Le Corre, the lead author of the new study.

The results come in light of a new analysis of data provided by Dawn suggesting that some of the olivine on Vesta may have resulted from olivine-rich meteorites impacting the body rather than being the product of internal geologic activity.

"The lack of abundant olivine on Vesta does not mean that it is not differentiated, as all evidence points to a Vesta that once had crust, mantle and a core," Le Corre said. "We just need to update our planetary formation models in light of new results from Dawn."

The paper titled "Exploring exogenic sources for the olivine on Asteroid (4) Vesta" has been accepted for publication in Icarus and presented today at the 46th Lunar and Planetary Science Conference in Houston.

PSI's Vishnu Reddy and Juan Sanchez are coauthors on the paper.

Provided by Planetary Science Institute