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Geologists: Black Diamonds Come From Outer Space

UPTON, N.Y., Jan. 12, 2007 -- Using infrared synchrotron radiation, geologists have discovered that Earth's so-called black diamonds originated in interstellar space.

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Scientists Jozsef Garai and Stephen Haggerty of Florida International University, along with researchers Sandeep Rekhi and Mark Chance from Cleveland's Case Western Reserve University, used infrared light from the National Synchrotron Light Source at Brookhaven National Laboratory in Upton to analyze the diamonds' elemental makeup and discover their origin.

Black, or carbonado, diamonds, came from outer space, geologists have discovered. (Photo: Steve Haggerty)



Trace elements critical to an origin are nitrogen and hydrogen, said Haggerty. The presence of hydrogen in the black diamonds, also known as carbonado diamonds, indicates an origin in a hydrogen-rich interstellar space, he and colleagues believe.

The term carbonado was coined by the Portuguese in Brazil in the mid-18th century; it's derived from its visual similarity to porous charcoal. Black diamonds are found only in Brazil and the Central African Republic.

Conventional diamonds are mined from explosive volcanic rocks (kimberlites) that transport them from depths in excess of 100 kilometers to the Earth's surface in a very short amount of time, said Sonia Esperanca, program director in the National Science Foundation's Division of Earth Sciences, which funded the research. This process preserves the unique crystal structure that makes diamonds the hardest natural material known.

From Australia to Siberia, from China to India, the geological settings of conventional diamonds are virtually identical, said Haggerty. None of them are compatible with the formation of black diamonds.

Approximately 600 tons of conventional diamonds have been mined, traded, polished and adorned since 1900. But not a single black/carbonado diamond has been discovered in the world's mining fields, said Haggerty.

The new data support earlier research by Haggerty showing that carbonado diamonds formed in stellar supernovae explosions. Black diamonds were once the size of asteroids, a kilometer or more in diameter when they first landed on Earth.

The research was published online on Dec. 20, 2006, in the journal *Astrophysical Journal Letters*.

For more information, visit: www.bnl.gov

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