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"Black" Diamonds May Come From Outer Space

An exotic type of diamond may have come to Earth from outer space, scientists say. Called carbonado or "black" diamonds, the mysterious stones are found in Brazil and the Central African Republic. They are unusual for being the color of charcoal and full of frothy bubbles. The diamonds, which can weigh in at more than 3,600 carats, can also have a face that looks like melted glass. Because of their odd appearance, the diamonds are unsuitable as gemstones. But they do have industrial applications and were used in the drill bits that helped dig the Panama Canal. Now a team led by Stephen Haggerty of Florida International University in Miami has presented a new study suggesting that the odd stones were brought to Earth by an asteroid billions of years ago The findings were published online in the journal Astrophysical Journal Letters on December 20. Explosive Theory The scientists exposed polished pieces of carbonado to extremely intense infrared light. The test revealed the presence of many hydrogen-carbon bonds, indicating that the diamonds probably formed in a hydrogen-rich environment—such as that found in space. The diamonds also showed strong similarities to tiny nanodiamonds, which are frequently found in meteorites. "Theyre not identical," Haggerty said, "but theyre very similar." Astrophysicists, he added, have developed theories predicting that nanodiamonds form easily in the titanic stellar explosions called supernovas, which scatter debris through interstellar space. The deposits in the Central African Republic and Brazil, he said, probably come from the impact of a diamond-rich asteroid billions of years ago, when South America and Africa were joined. So even though the two diamond fields are now thousands of miles apart, theyre remnants of a single, original deposit. Haggerty estimated that the asteroid must have been about half a mile (one kilometer) in diameter. Fizzing Froth The unusual bubbles in the diamonds probably came from fizzing gases when the diamonds were forming, Haggerty added. This adds further credence to the extraterrestrial origin theory, since conventional diamonds form under immense pressure deep beneath the Earths crust, where gas bubbles simply couldnt form. But diamonds can be formed in the laboratory without intense pressure via a process called carbon vapor deposition. "That [process] can certainly happen in interstellar space," Haggerty said. "There should be a lot of diamond out there." Controversial Finding But not everyone believes that Haggertys team has made its case. "The comparison with nanodiamonds in meteorites is misleading," said Scott Messenger an astrophysicist at NASAs Johnson Space Center in Houston, Texas, who studies ancient stardust embedded in meteorites and cometary dust. Nanodiamonds "are vanishingly small—only a few thousand atoms in each," he continued by email. "These diamonds are enormous." In addition, diamond grains from interstellar dust contain "extremely exotic" isotope compositions, he said, whereas carbonado diamonds do not. Frank Stadermann of Washington University in St. Louis agrees. "The fact that we have never seen anything similar in extraterrestrial samples does not represent an actual proof that this is not extraterrestrial," he said by email. "But this argument works the other way, too. The fact that we have never seen anything like this in previously studied terrestrial samples does not represent an actual proof that it is not terrestrial in origin." Haggerty countered that carbonado diamonds contain a mineral called osborneite, which has been found only in meteorites and comet dust recovered by the recent Stardust mission. (Related: "Stardusts Comet Clues Reveal Early Solar System" [December 15, 2006].) He also pointed out that carbonado diamonds have never been reported among any of the other 600 tons of "conventional" diamonds mined, sorted, graded, traded, cut, and polished in the last century. "Surely, just one would be expected if [they are] terrestrial in origin," he said. On a ten-point scale, Haggerty said, hes reached "about a nine" in terms of demonstrating that the diamonds dont come from Earth. But hes ready to seek further proof. "The acid test," he said, "would be to identify a carbonado body in the Asteroid Belt."

Richard A Lovett for National Geographic News

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