News

Diamonds are from outer space

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SYDNEY: Black diamonds, a rare and enigmatic form of the famous gemstone, have their origins in interstellar space, U.S. researchers say.

The stones, also called carbonado diamonds, formed in a hydrogen-rich environment such as was present before the formation of the planets - or outside our Solar System entirely, report scientists in a paper published online in the journal *Astrophysical Journal Letters*.

"Trace elements critical to an 'ET' [extraterrestrial] origin are nitrogen and hydrogen," said lead author Stephen Haggerty, of Florida international University. The researchers discovered the tell-tale elements when they bombarded a roughly three billion-year-old crystal with infrared (IR) radiation in a synchrotron at the Brookhaven National Laboratory in New Jersey.

Black diamonds are a charcoal-coloured, porous version of the gemstone. New research indicates they may have come from interstellar space.

Image: Steve Haggerty

"The new IR measurements are consistent with the formation of carbonado diamonds in an interstellar environment," the researchers reported in the article.

The term carbonado, derived from the diamonds' visual similarity to charcoal, was coined by the Portuguese in Brazil in the mid 1700s. Black diamonds are found only in Brazil and the Central African Republic.

The diamonds are very porous, sometimes up to 30 per cent air, and contain numerous metals and metal alloys. These characteristics are not compatible with a conventional, subterranean origin, said the researchers.

The idea that the diamonds are of extraterrestrial origin was put forward to explain their unusual composition, but spectral analysis of the mysterious minerals had, until now, been foiled by interference from the silica-based minerals that choke the pores of the stones. The researchers were able to remove the silica to perform their research.

No matter where on Earth they come from, the geological settings of 'conventional' diamonds are virtually identical, said Haggerty. The stones are mined from ancient deposits of explosive volcanic rocks called kimberlites.

But while nearly 600 tonnes of conventional diamonds have been mined, the researchers point out that since 1900, "not a single black/carbonado diamond has been discovered in the world's mining fields". Additionally, none of the geological processes that lead to the formation of conventional diamonds are compatible with the formation of black diamonds.

The absence of black diamonds in deposits had long baffled researchers, and led to several theories for their origin, including radioactive processes and shock from meteoric impact.

According to the researchers, black diamonds were once the size of asteroids - a kilometre or more in diameter - when they first collided with Earth.

Diamonds on this scale are not implausible, they said, pointing to findings that indicate that some stars, called crystalline white dwarfs, may be a form of modified diamond.

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