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News & Comments

Ancient canyon reveals mysterious, unseen diamonds

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It is possible to identify the remains of such events by their distinctive materials, such as shocked quartz, which is produced when a space rock slams into the Earth at extreme temperatures and pressures. Scientists have misinterpreted Canyon Diablo diamonds because of their unusual structures. Minerals can be produced by very different processes. As asteroid impact waves dissipate energy, diamonds are produced from the shock wave when a fragment of the asteroid strikes the Earth.

The Canyon Diablo meteorite diamonds, however, were found to be unlike ordinary gemstones when researchers used advanced imaging techniques. Diamonds are hard, but these stones are unusually malleable, according to scientists. Further, they can be tuned to have electronic properties, making them potentially useful for electronic devices. Previously thought to consist of hexagonal lattices of atoms, Lonsdaleite was discovered in 1967 in the Canyon Diablo meteorite. Amorphous carbon graphene and graphyne were added to the list of carbon allotropes (ways the remarkably versatile element can be arranged). When Dr. Péter Németh and coauthors examined lonsdaleite using Raman spectroscopy and crystallography, they found something fascinating. Diaphites are growths of graphene-like domains and traditional cubic diamonds that form lonsdaleite. A number of atoms are also misplaced in the crystal.

Diaphites have been found in meteoritic lonsdaleite, which suggests the material could be found in other carbonaceous materials as well, making it accessible for use as a resource. As a result of the discovery, researchers have a better understanding of the pressures and temperatures that were required to create the structure. The researchers believe it could one day be used for more targeted medicines, tinier electronics with lightning-fast charging speeds, and faster and bendier technology, as it is as light as a feather and as strong as a diamond, transparent and highly conductive, and 1 million times thinner than a human hair. It is hoped that lessons learned from lonsdaleite can be applied to other carbon-rich materials containing significant amounts of other elements. Now that graphene growths have been discovered inside meteorites, researchers can learn more about their formation - and could possibly grow one in the lab.

KEYWORDS

Meteorite, diamond, planet earth, lonsdaleite, Diaphites, hexagonal lattices, Amorphous, carbon graphene, shock wave, Canyon Diablo meteorite diamonds, Canyon Diablo, meteorite diamonds, shocked quartz