Adamantine Encyclopedia Article

Adamantine

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Adamantine

Some transparent **minerals** with very high indices of refraction have a non-metallic, brilliant manner of reflecting and transmitting light called an adamantine luster. **Diamond** is the bestknown adamantine mineral, and its coveted sparkle is an example of this type of non-metallic luster. A diamond's internal structure of covalently-bound **carbon** atoms in a three-dimensional matrix causes incident light to refract deeply into the crystal, giving the crystal its characteristic clarity. The isometric, or three-dimensionally symmetrical, crystal structure of diamond also causes light to disperse within the mineral giving cut diamonds their spectral "fire." The synthetic diamond substitute, cubic zirconium, or CZ, has an adamantine luster due to its high index of refraction, but its dispersion, though relatively high, leaves this copy without the fire of the real diamond.

The index of refraction, *n*, for a given material is the ratio between the velocity of light in air, and its velocity in a denser material. Snell's law defines the precise relationship between the angle of incidence (*i*), and the angle of refraction (*r*), as sin *i*/sin *r*=*n*, where *n* is again the index of refraction. Non-metallic minerals with tightly bound, tightly packed atoms in a strong three-dimensional crystal lattice are more likely to have a high index of refraction. They are also more likely to be very hard and to have an adamantine luster. The mineral corundum, whose colored varieties include the **gemstones** ruby and sapphire, has a hardness of nine on the Moh's scale and a vitreous to adamantine luster. The **lead** carbonate mineral, cerussite, and lead sulfate mineral, anglesite, also have adamantine lusters.

See Also

Crystals and Crystallography