

An Imitation of Black Diamond: Artificial Black Cubic Zirconium Oxide

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Black as a color has been in vogue for the past several years. This trend has reached the jewelry trade and, as a result, large quantities of black diamonds have been set in various types of jewelry. In 1998, SSEF checked more than 3,000 carats of purported black diamonds for color authenticity. During these examinations, several pieces of artificial black zirconium oxide (cubic zirconia—CZ) were identified.

Black diamond usually occurs as single crystals with numerous black graphite inclusions (see, e.g., Kammerling et al., 1990). Carbonado is a natural sintered polycrystalline aggregate of minute diamond crystals with a granular-to-compact structure. It is always opaque and may be black, brown, or dark gray; less commonly, it is "brick" red to pale purple and light green. Bort is a black polycrystalline form of diamond (Haggerty, 1998). Carbonado and bort are sometimes called "black diamond" by the trade.

Faceted black CZ can be easily separated from black diamond by its rounded facet junctions, absence of inclusions, dark brown appearance when viewed with a powerful fiber-optic light, and specific gravity (Kammerling et al., 1991). For round-brilliant-cut samples, a comparison of the diameter to the weight is sufficient to distinguish black CZ from black diamond.

X-ray fluorescence (EDXRF) analyses were performed on several of the suspect black specimens. The analyses revealed a predominance of zirconium, with lesser amounts of yttrium and hafnium, which confirmed that these samples were CZ.

REFERENCES

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