Zircon

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The mineral zircon has quite often been used in jewelry to simulate the diamond. However, it is hardly ever found in nature in a colorless state.
Chemically, zircon is the silicate of the element zirconium in company with traces of uranium, and its formula is written as ZrSi04. Normally, it is found in well-shaped crystals belonging to the tetragonal crystal system. These crystals are usually a reddish-brown shade, although sometimes their color is a yellowish-green. The reason for this variation is that zirconium silicate occurs in what is known as the high and low forms. The former constitute the brown variety, while the latter are the green stones.

The explanation of high and low lies in their physical properties. For example, the high form has a greater specific gravity than its low relative, which means that if a high and a low stone are of identical size, the high form will weigh more than the low form. High zircons are also strongly double refractive, whereas the lo"w types show far less of this property.

What are the reasons why the same mineral can behave so differently? Again, the explanation is within the crystals themselves and the way their atoms are arranged.
It has been mentioned already that zircon contains small traces of the element uranium or thorium—which is associated with radioactivity in one form or another. In the low-type zircons, the orderly arrangement of atoms within the crystal has partially collapsed due to radioactivity. This collapse is brought about by the discharge of alpha particles (the nuclei of helium atoms) from the radioactive element, which displace some of the atoms within the zircon crystal. Some low zircons can be restored to the high form by heating them to a high temperature, but exactly why this takes place in some stones and not in others is not known.

Heat has another effect upon the stone. As already indicated, zircons are rarely used in their natural colors in jewelry, most of them being either colorless or a rather beautiful blue color. The desired colors are obtained by a carefully applied heat treatment to which the natural brown stones are subjected and that renders them either colorless or blue. Zircon is essentially an oriental gem stone, and, for years, the Ceylon gem gravels were its only important source. Today, Thailand and Vietnam also produce fine stones. Most of the blue and colorless zircons are heat treated and cut in Bangkok.

Zircon has a hardness of 7,5 on the Mohs scale, and, being only slightly harder than quartz, may show wear if worn for long periods as a ring stone. Yet, in an attempt to simulate the diamond, it is often worn as such. The fire of zircon is inferior to that of a diamond, but, if cut in the same way, it may well fool the unsuspecting into believing that it is the more precious stone. A good magnifying glass, however, will quickly reveal the strong double refraction of zircon—clearly showing two images of the edges between the back facets if the stone is viewed from the front.

The diamond, as already pointed out, belongs to the cubic crystal system, the minerals of which show no double refraction. A diamond will show only one image of its back facets when viewed with a lens through the front. Mineral deposits of zircon in Brazil, India, and New South Wales, Aus¬tralia, have considerable commercial importance as sources of the metal zirconium that, together with its compounds, is becoming increasingly im-portanHn industry. The metal is used in alloys and in the purification of steel.