

Why does alexandrite appear to change color in sunlight and artificial light?

Alexandrite is a trichroic gemstone which absorbs and reflects light differently in each of its three optical directions. Spectroscopic analysis reveals a different absorption spectrum for each of the three optical directions. The differences in absorptions cause different colors to be seen when viewed from different directions in relation to the crystal structure. However, it is not the trichroism that is responsible for the remarkable color change. The color change phenomena is a result of the presence of chromium +3 ions and the way they absorb and reflect light. In rubies the chromium absorption band is around 550 nanometers and in emeralds, the band is around 600nm. In alexandrite, where the band is at 580nm and right between ruby red and green emerald, the stone is balanced between them.

Daylight contains high proportions of blue and green light and incandescent lighting contains a higher balance of red light. When the light is balanced (daylight), the stone is green but when the light source is reddish (incandescent), the stone appears red.

Human vision is more sensitive to green light. Alexandrite reflects both green and red light. In daylight, a greater proportion of green light is reflected so we see green. Conversely, under incandescent light more red light is reflected so we see red.

See Alexandrite Tsarstone collectors guide, Why does alexandrite appear to change color in sunlight and artificial light?, <http://www.alexandrite.net/viewpage.html?id=GG-0126> (Alexandrite is a trichroic gemstone which absorbs and reflects light differently in each of its three optical directions. Spectroscopic analysis reveals a different absorption spectrum for each of the three optical directions. The differences in absorptions cause different colors to be seen when viewed from different directions in relation to the crystal structure. However, it is not the trichroism that is responsible for the remarkable color change. The color change phenomena is a result of the presence of chromium +3 ions and the way they absorb and reflect light. In rubies the chromium absorption band is around 550 nanometers and in emeralds, the band is around 600nm. In alexandrite, where the band is at 580nm and right between ruby red and green emerald, the stone is balanced between them.) (as of).