

Garnet : from stone to Star

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Natural garnets are used as gemstones since Ages. Also used as historical symbols, they are part of legends in all countries. Of bright colors and clear transparency, this mineral has attracted a large number of jewelers, mineral collectors, artists, but also painters, since the dawn of time. Even in architecture and sculpture are found adornments made of garnets.

On an archeological point of view, the hardness of this mineral has protected historical garnets as it enhances the resistance to alteration. Thus, this gemstone can travel through time without noticeable weathering and can be used to trace ancient trading routes and understand the origin and nature of garnet used in ornaments.

Garnet gemstones are remarkable by their colors and shades from green to orange and red. Naturally multi-faceted, these quite complex minerals form wide solid-solutions with each other and captivate people with their incomparable range of colors which are largely controlled by the crystal chemistry of substituted transition elements. The variations of colors and hues of garnets are related to the presence of coloring agents such as Fe, Mn, Cr, V, Ti substituted in the structure of garnet solid-solutions between various end-members $A_3B_2(SiO_4)$. Spectroscopic techniques demonstrate how the nature and concentration of these cations explain the color variation.

This presentation will emphasize some aspects of garnets as important cultural heritage and discuss the crystalchemical factors that produce the myriad colors of this fascinating mineral supergroup.