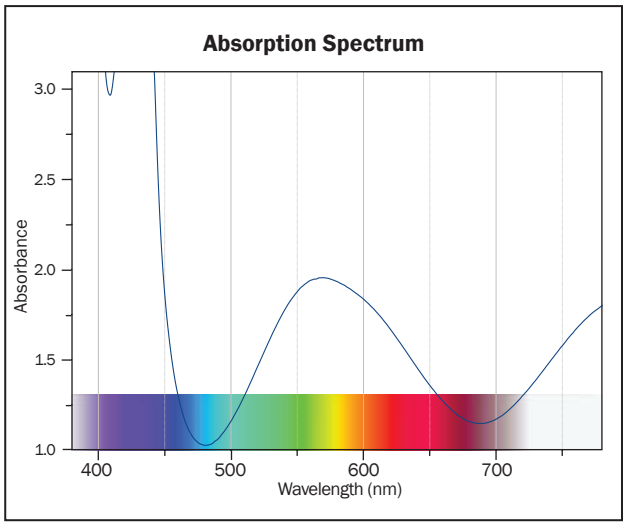

Figure 21: The visible-range absorption spectrum of the investigated scorodite (here, illuminated with an approximately 3,400 K light source) displays distinct transmission windows at 480 and 688 nm that account for the colour change.

to 500 nm, causing the dark green colour shown in Figure 20a.

Usually Cr^{3+} and V^{3+} (and less commonly REEs) are described in the literature as the causes of a colour change in gems (e.g. Schmetzer et al., 1980; Hänni, 1983). The scorodite described here revealed no traces of Cr^{3+} or V^{3+} in EDXRF analyses; also no bands associated with these elements were recorded in the absorption spectrum. Therefore, it appears that Fe^{3+} (and its associated strong absorption band at 570 nm) is the sole cause of the colour change in this scorodite.

Gebhard (1999) also mentioned colour-change scorodite from Tsumeb, and Weiß (2000) described it from Hemerdon in south-west England. Gebhard (1999) described the colour change as greenish blue to blue-green, while the samples documented by Weiß (2000) changed from intense blue in sunlight to grey-blue or grey-yellow in 'artificial' light, pale green in 'neon' light and bright yellowish green in the light of an 'energy-saving' lamp.

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Stichtite as a Gem Material

Stichtite, $Mg_6Cr_2CO_3(OH)_{16} \cdot 4H_2O$, is an attractive purplish pink to purple mineral of the hydrotalcite group that is very soft, with a Mohs hardness of just 1½–2. Nevertheless, because of its attractive colour, this material is sometimes polished as a collector's stone. Such gems commonly are sourced from Tasmania, Australia, and typically consist of compact aggregates of stichtite that form in association with serpentinite, producing striking colour combinations of purple and yellow-green (e.g. Laurs, 2012). Less frequently encountered are nearly monomineralic stichtite gems (e.g. Koivula et al., 2003).

At the 2016 Tucson gem shows, rare-stone dealer Mauro Pantò had approximately 50 nearly monomineralic faceted stichtites (~1.0–2.5 ct) from South Africa. Two regions in South Africa are known to produce stichtite, in Limpopo

and Mpumalanga Provinces (www.mindat.org/min-3784.html); the particular origin of Pantò's stones is unknown. He kindly donated to Gem-A a 1.70 ct faceted hexagon (Figure 22), and it was characterized for this report by authors CW and BW.

The stone was opaque with a pinkish purple colour and a waxy lustre. A faint RI was recorded at approximately 1.54 and SG was measured hydrostatically as 2.11; these values are similar to those reported by Koivula et al. (2003). The sample was inert to both long- and short-wave UV radiation. Microscopic observation revealed a polycrystalline oolitic structure with tiny pearlescent cleavage reflections similar to those commonly seen in amazonite. In addition, small black inclusions were distributed throughout the stone.

Raman analysis with an Enwave spectrometer (789 nm laser) confirmed its identity as stichtite. Chemical analysis with an Amptek X123-SDD EDXRF spectrometer showed major amounts of Cr and also some Fe (possibly present within the dark inclusions). Raman analysis of areas containing the dark inclusions was inconclusive, but the presence of Fe combined with the stone's significant magnetic susceptibility suggested magnetite or chromite; similar-appearing inclusions were identified as chromite in the sample examined by Koivula et al. (2003).

While the low hardness of stichtite does not allow for its common use in jewellery, when cut as a cabochon it may be suitable for pendants and other items that receive gentle wear. Such a pendant was submitted to Stone Group Laboratories in mid-2016, in which stichtite was set with various quartz gems (Figure 23).

Figure 22: This stichtite (1.70 ct) was faceted from material that was mined in South Africa. The low lustre and rounded facet junctions visible at the lower right are consistent with the low hardness of stichtite. Gift of Mauro Pantò; photo by C. Williams.

Figure 23: This pendant containing a 13 × 18 mm-wide cabochon of stichtite was submitted to Stone Group Laboratories in mid-2016. It also is set with pale amethyst, CVD-coated colourless quartz and black onyx, in sterling silver. Photo by B. Williams.

Cara Williams FGA, Bear Williams FGA and Brendan M. Laurs FGA

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