

Cause of Color in Yellow Sapphire, Plus Characterization of Oregon Sunstone, Ukrainian Beryl, and British Columbian Iolite



Welcome to the Fall 2023 issue of *Gems & Gemology*! This issue delivers four feature articles covering a range of colored stone topics, from a color study of yellow sapphire to a new source of violet-blue iolite in Canada.

In our lead article, Dr. John Emmett and coauthors investigate the various chromophores responsible for color in four types of yellow sapphire—natural, heat-treated, beryllium-diffused, and synthetic. These chromophores include Fe^{3+} , a trapped hole associated with iron ($\text{h}\cdot\text{-Fe}^{3+}$), and a combination of the two, all of which are involved in the coloration of natural and treated yellow sapphire. Synthetic yellow sapphire, on the other hand, is usually colored by the Ni^{3+} chromophore or by a combination of Ni^{3+} and Cr^{3+} .

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Next, Dr. Shiyun Jin and colleagues share their research on the special colors and optical effects caused by metallic copper inclusions in Oregon sunstone. Using samples from different mines in Oregon, they explore absorption and scattering, pleochroism, and color zoning in this gem-quality feldspar known for its wide range of beautiful colors.

A team led by Dr. Gerhard Franz reports on the morphological characteristics of green beryl and the yellow beryl variety heliodor from the Volyn pegmatite field in Ukraine. The authors observe an abundance of characteristic etch pits throughout the samples and offer details on distinguishing Volyn green beryl and heliodor from those found in other localities.

Dr. Philippe Belley contributes our final feature article, an examination of violet-blue iolite from new deposits in the Thor-Odin dome in British Columbia, Canada. Various samples are analyzed to reveal the nature of their chemical composition, mineral and fluid inclusions, and chatoyancy. The abundance of cordierite-rich rocks in the Thor-Odin dome indicates potential for future iolite discoveries in the area.

G&G's regular columns contain exciting gemological findings from all over the world. *Lab Notes* details recent noteworthy submissions to GIA's laboratories, including a 4.04 ct ring fashioned from a single-crystal CVD-grown diamond, a nacreous atypical bead cultured pearl featuring a flame-like surface structure, and a heart-shaped ruby filled with zinc glass. Observations of fascinating internal features are captured in the *Micro-World* section, including a rare iridescent ferropericase in brown diamond, bladed columbite crystals in topaz, and zigzag-patterned fingerprints in blue sapphire. *Diamond Reflections* returns in this issue, focusing on diamonds formed within eclogitic mantle host rocks. Finally, *Gem News International* offers brief studies of Burmese chameleon amber, Guatemalan omphacite jade, and other gem materials, as well as coverage of the recent Turquoise United conference and the Chicago Responsible Jewelry Conference.

Congratulations to this year's *G&G* Challenge participants who received a perfect score! See a list of the top scorers on page 322. Thank you to those who put their knowledge to the test.

We hope you enjoy the latest edition of *Gems & Gemology*!

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