Bellerophon | Gemlab

« The Majestic Padparadscha of Ceylon »

Gemological Report No. SAMPLE

Privilege No. 8888

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- PREFACE

Colored gemstone

"The first objects that we picked up and said this has value for no other reason, it is not a food, not a fuel, not a medicine, it has value purely because of its beauty, these were colored gems".

_ Martial Curti

INTRODUCTION

Gemstones have fascinated the human mind since the dawn of time. They have inspired myths and curses and have been worn by the greatest kings and emperors, who often owned the finest gems. In ancient lore, some believed these radiant treasures were the tears of gods or fragments of fallen stars, imbued with mystical energies. All the gemstones we so greatly treasure and admire come from various depths and locations in the Earth's crust, forged over millions of years in a dance of heat, pressure, and chance.

People have valued gems for many reasons throughout history. Some of these include their use as beautiful decorative ornaments, religious symbols, good-luck charms, and for medicinal purposes. The elusive Hope Diamond, for instance, was said to carry a curse that brought misfortune to its owners, yet it remains one of the world's most coveted jewels. Primarily, however, gemstones have been used to display wealth, status, and power.

The Egyptians and, later, the Romans were among the first to celebrate the power of gemstones. For example, Cleopatra was known for her love of emeralds, which were believed to possess powers of clairvoyance and to defeat spells and enchantments. To her, these vivid green stones were not just adornments but keys to divine insight, a belief that echoes through the ages.

T. Rozet

EXAMINATION RESULTS

A Magnificent Sapphire

- "These gems have life in them: their colors speak,
  say what words fail of"

_ George Eliot

On January 1st, 2025, Bellerophon Gemlab meticulously scrutinized a natural sapphire, as documented in Report No. SAMPLE.

This gemstone, of remarkable allure, warrants distinguished recognition. The sapphire, boasting transparent clarity, is masterfully crafted into an oval shape, adorned with a modified brilliant crown and a modified step pavilion. With a substantial weight of 88.888 carats, it displays a captivating Padparadscha hue.

During examination, minimal microscopic internal features were detected, alongside a harmonious blend of trace elements characteristic of sapphires sourced from the esteemed Ceylon (Sri Lanka) region. Analytical tests confirmed the absence of thermal enhancement or clarity modification, affirming the gem's natural clarity and color origin. Rare in both size and quality, the possession of such a natural sapphire is a singular privilege.

BY MARTIAL CURTI CEO & FOUNDER

IMAGE IS APPROXIMATE IN SIZE AND COLOUR

Bellerophon | Gemlab

PRIVILEGE GEMMOLOGICAL REPORT

Report Number	SAMPLE
Date	01 January 2025
Weight	88.888 carats
Measurements	38.88 x 28.88 x 18.88 mm
Shape	Oval
Identification	Natural Sapphire
Color	Pinkish Orange
Color Stability	Stable
Comment	No indications of any treatment
Origin	Ceylon (Sri Lanka)
	Sapphire from Sri Lanka formed ~550 m.y.a

This Sapphire may be called "Padparadscha" in the trade.

M.P.H. Curti *T. Rozet*

SAPPHIRE

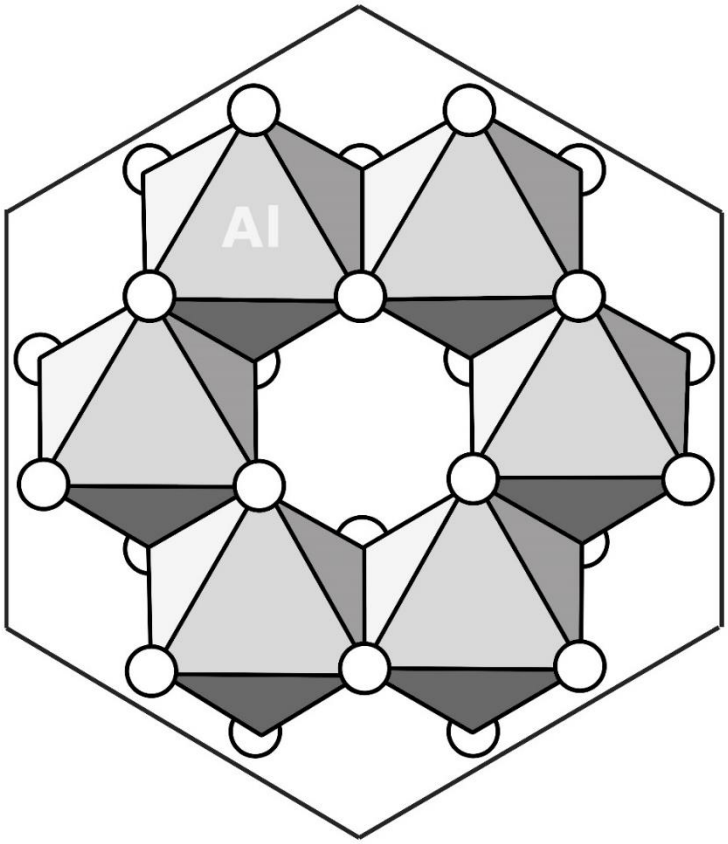
Al_2O_3 + Ti, Fe, Cr, V …

– "A transparent gem variety of corundum other than red (aluminum oxide)."

Sapphire, a member of the corundum family, is an aluminum oxide that crystallizes in the trigonal crystal system, forming tabular and bipyramidal crystals. The color range of sapphire varieties is determined in part by foreign trace elements incorporated into the lattice. The most important of these are titanium, iron, chromium, and vanadium. Their presence is highly variable and can reach several weight percent.

Sapphire is the second-hardest natural gemstone, registering 9.0 on the Mohs scale of mineral hardness, between diamond (10) and topaz (8). Its exceptional durability has made it a favored material not only for jewelry but also for practical applications, such as the scratch-resistant windows in luxury watches.

Sapphire is one of two gem varieties of corundum, the other being ruby (defined as corundum in a shade of red). Although blue is the best-known sapphire color, they occur in every color, including gray, black, orange, violet...



Corundum Crystal Structure

HISTORY & LEGEND

The word "sapphire" can be derived from many etymologies. The oldest is most likely Semitic, with the word "saffir" meaning "the most beautiful," or from the Greek word "sapfeiros," which probably referred to lapis lazuli. In ancient Greece and Rome, kings and queens were convinced that sapphires protected their owners from envy and harm.

During the Middle Ages, the clergy wore blue sapphires to symbolize Heaven, while ordinary folk believed the gem attracted heavenly blessings. In other times and places, people attributed to sapphires the power to guard chastity, make peace between enemies, influence spirits, and reveal the secrets of oracles. Traditionally, sapphire symbolizes nobility, truth, sincerity, and faithfulness. It has adorned the robes of royalty and clergy members for centuries.

Throughout history, sapphires have been steeped in legends that amplify their mystique. In Persian mythology, it was said that the Earth rested on a giant sapphire, its reflection giving the sky its blue hue a tale that underscores the gem's celestial allure. Warriors in ancient times wore sapphires into battle, believing the stone could render them invincible or turn aside arrows, while medieval alchemists prized it as an antidote to poison, claiming it would sweat or change color in the presence of venom.

One famous sapphire, the Star of India, a 563-carats marvel, carries a legacy of theft and recovery, its six-rayed star pattern said to shimmer with protective energy. These stories, spanning cultures and eras, cement sapphire's place as a gem of both earthly power and otherworldly wonder.

GEOLOGICAL & GENETIC CONSIDERATIONS

- "The beginning is the most important part of the work".

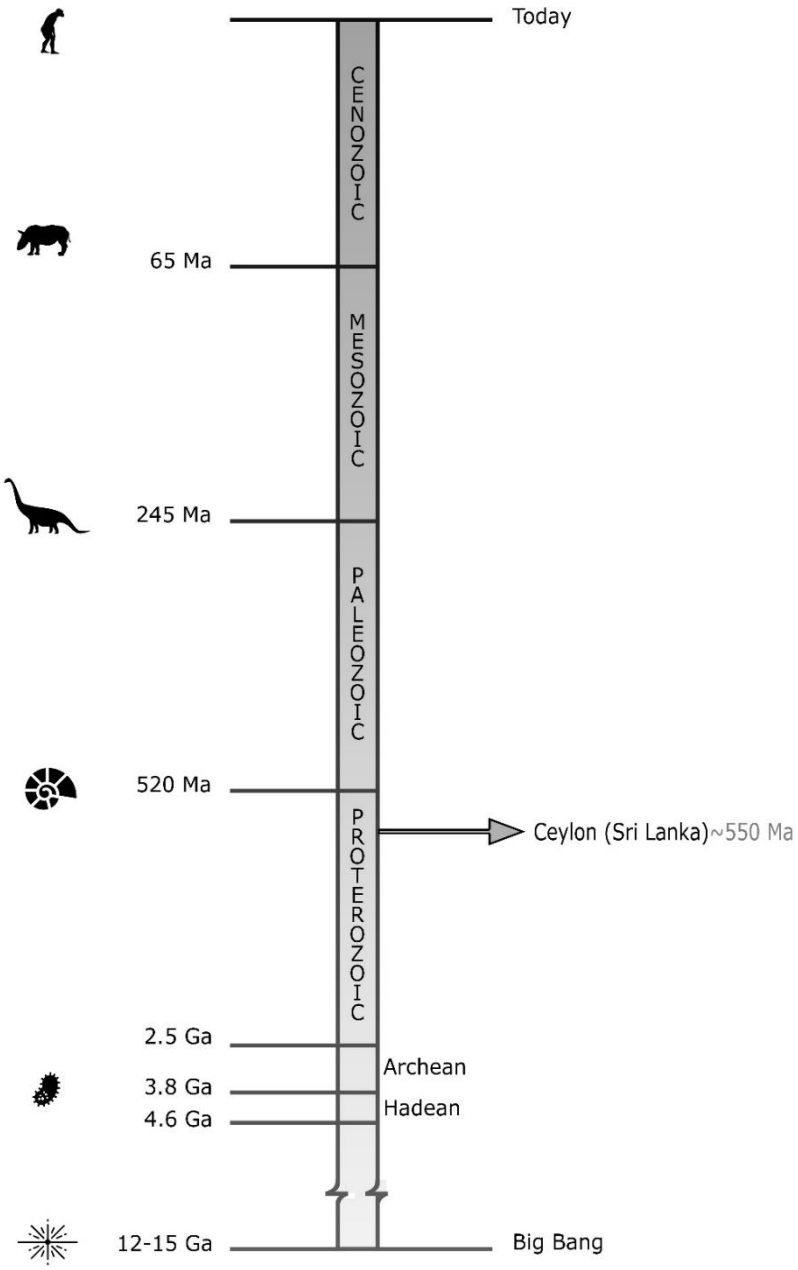
Plato

Sapphires are mined from alluvial deposits and from primary open air or underground mines. Sapphires from different geographic locations may exhibit distinct appearances or chemical-impurity concentrations and tend to contain varying types of microscopic inclusions. Because of this, sapphires can be divided into three broad categories: classic metamorphic, non-classic metamorphic and magmatic.

In many areas, natural weathering and erosion have liberated the stones from their host rock and carried them into streams over long periods of geologic time. Today, these gems are mined from stream sediments. Their high specific gravity relative to other sediment particles often causes currents to concentrate them in small placer deposits.

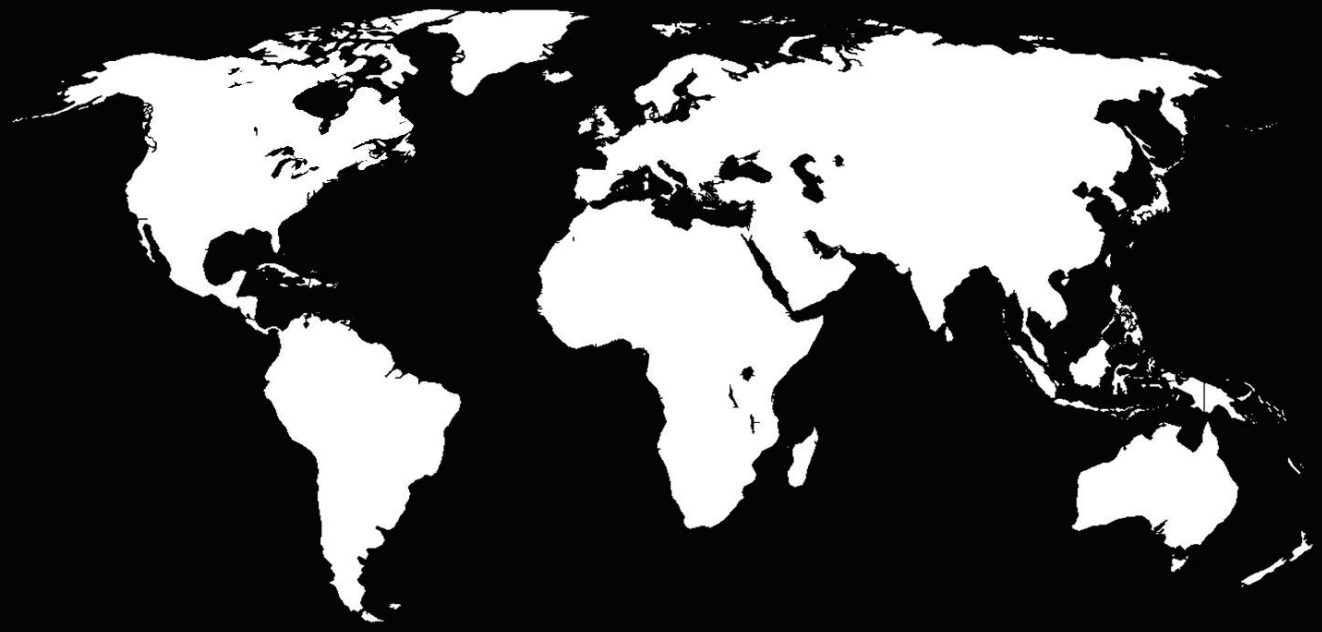
The story of corundum in prehistoric river systems stretches back millions of years, when ancient rivers carved through the Earth's crust, transporting and concentrating these durable gems. In regions like Sri Lanka and Madagascar, geologists trace sapphire-rich placer deposits to prehistoric river channels that once flowed through landscapes vastly different from today's. These rivers, active during epochs like the Mesozoic, Cenozoic, Paleozoic or Proterozoic eroded corundum from primary metamorphic or igneous sources such as the high-pressure zones of ancient mountain belts and deposited them in gravel beds as the water slowed. Over time, tectonic shifts and climatic changes buried or reworked these riverbeds, leaving behind concentrated pockets of sapphires and rubies.

Estimation age for sapphire mineralization in Ceylon (Sri Lanka).



200 MILLION YEARS AGO

TODAY



CEYLON (SRI LANKA)

Sri Lanka was affectionately known as "Ratna-Dweepa," which means "Gem Island." The name reflects the island's natural wealth. Many Sri Lankan kings sent gems and pearls to foreign countries in efforts to establish trade and diplomatic relationships. In 250 BC, the king at the time was reported to have gifted three varieties of gems and eight types of pearls to the Indian emperor.

Sri Lanka not only produced gemstones of remarkable variety; its mining, cutting, and polishing industry dates back centuries. Almost all the stones found in Sri Lanka since the time of the ancient kings have been cut and polished before being exported.

The Pan-African orogeny was a series of major Neoproterozoic orogenic events related to the formation of the supercontinents Gondwana and Pannotia around 600 million years ago. Gemstone deposits in Sri Lanka, East Africa, India, and Madagascar are linked to the collision between eastern and western.

Geologically speaking, Sri Lanka is an extremely ancient land. Ninety percent of the island's rocks are of Precambrian age ranging from about 560 million to 2,400 million years ago. It has been estimated that a very important part of Sri Lanka's total land area is potentially gem-bearing, making it one of the countries with the highest density of gem deposits relative to its landmass.

PADPARADSCHA

SAPPHIRE

- All gemstones are gifts of nature
but only the best display Padparadscha color.

Sunrises and sunsets, lotus flowers, and tropical fruits the color range of a Padparadscha falls within a delicate balance of two colors: pink and orange. "The name "Padparadscha" traces back to the Sanskrit "padma raga," meaning "lotus color,". One of the rarest gemstones in the world, Padparadscha sapphires are rivaled by no other gemstone species in the mineral kingdom.

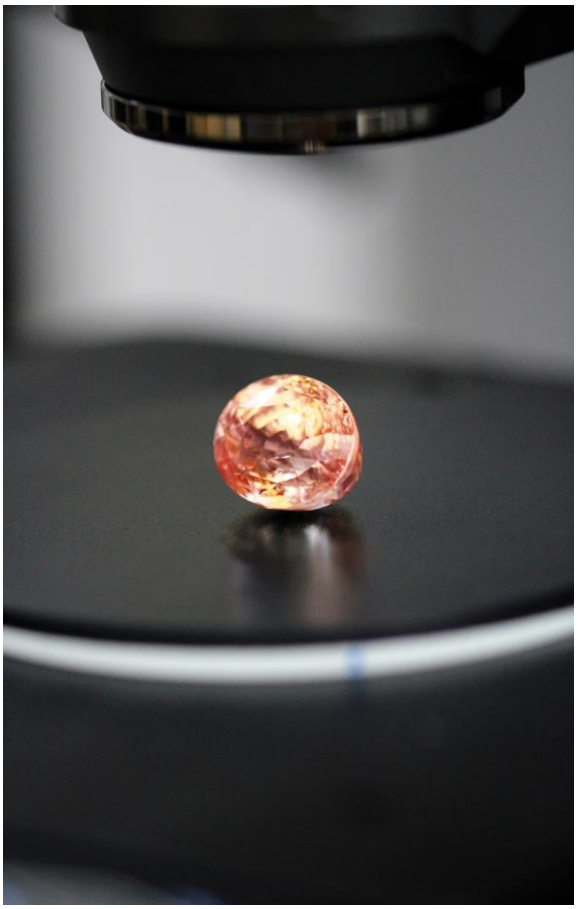
Sri Lanka's Ratnapura region, known as the "City of Gems," remains the historic heart of Padparadscha production, its alluvial gravels yielding these treasures for centuries. These extremely rare stones are unknown to most, but when discovered, they usually become an absolute favorite.

While Padparadscha sapphires have been sought after by collectors and connoisseurs for a long time, this uniquely colored and highly rare variety of sapphire was catapulted into prominence with Princess Eugenie's Padparadscha sapphire engagement ring.

ANALYTICAL PROPERTIES

"I am among those who think that science has great beauty"

_ Marie Curie



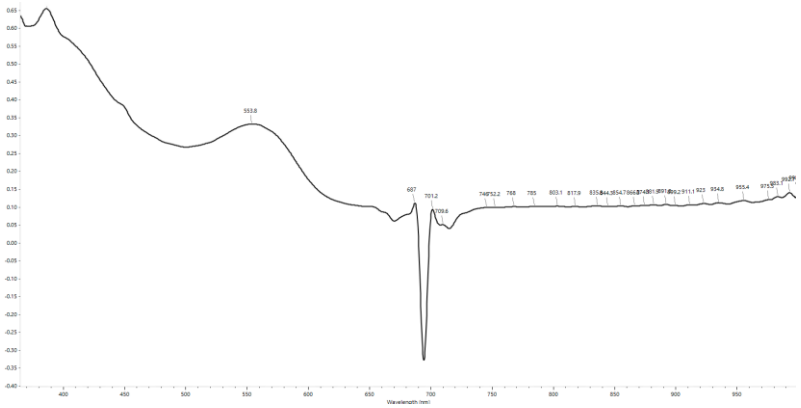
The testing of a colored gemstone at Bellerophon Gemlab involves a full range of analytical methods. Some are traditional, such as measuring the refractive index and specific gravity. Others involve state-of-the-art techniques, such as spectroscopy and laser-induced breakdown spectroscopy. Together, these combined techniques provide a deep understanding of the gemstone's properties.

The present gemstone was studied using all available instrumentation by a team of experienced gemologists. Their combined observations and data interpretations are detailed in the following pages. From these data, the chemical fingerprinting, the spectral fingerprinting in the UV-Vis-NIR region, and the vibrational fingerprinting (Raman and FTIR range) are the most valuable characteristics for the gemological interpretation of the gemstone. Chemical fingerprinting is performed using EDXRF (energy-dispersive X-ray fluorescence) and LIBS (laser-induced breakdown spectroscopy).

Spectral Fingerprinting – UV-Vis-NIR

Absorption spectra reveal which portions of light are absorbed by the gemstone and which are present in the transmitted light. It is the type and quantity of foreign elements that determine how much and which wavelengths of light are absorbed.

Ultraviolet-Visible-Near Infrared (UV-Vis-NIR) absorption spectroscopy is a complementary technique to EDXRF for examining a gemstone's chemistry. This is because trace element chemistry controls the gemstone's color, providing information about the color-inducing elements it contains.

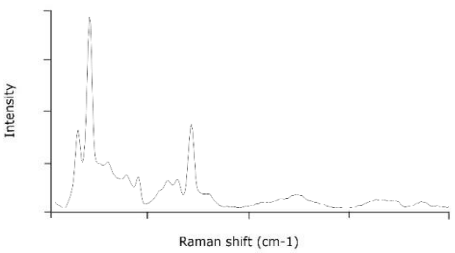


Raman Spectroscopy

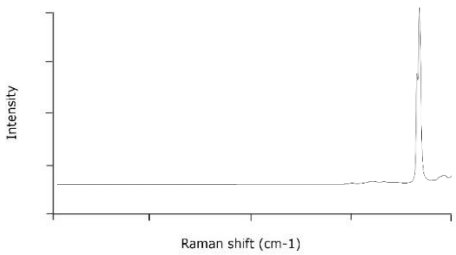
Raman spectroscopy is a non-destructive vibrational spectroscopy technique. A typical Raman instrument consists of a classical microscope with either transmitted or reflected light, a low-power laser excitation source, a spectrometer for high-resolution light analysis, and an appropriate computer for data collection and analysis.

Raman spectrometers are useful for rapidly identifying gemstones, as most materials produce characteristic Raman spectra. Most Raman spectrometers can measure photoluminescence as well as Raman scattering.

Raman

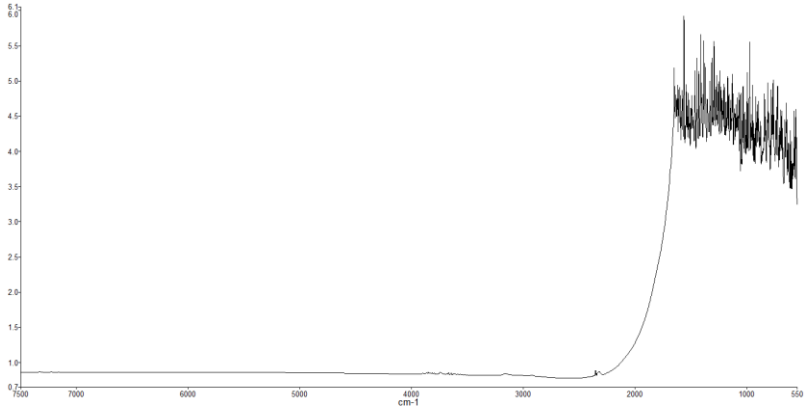


Photoluminescence



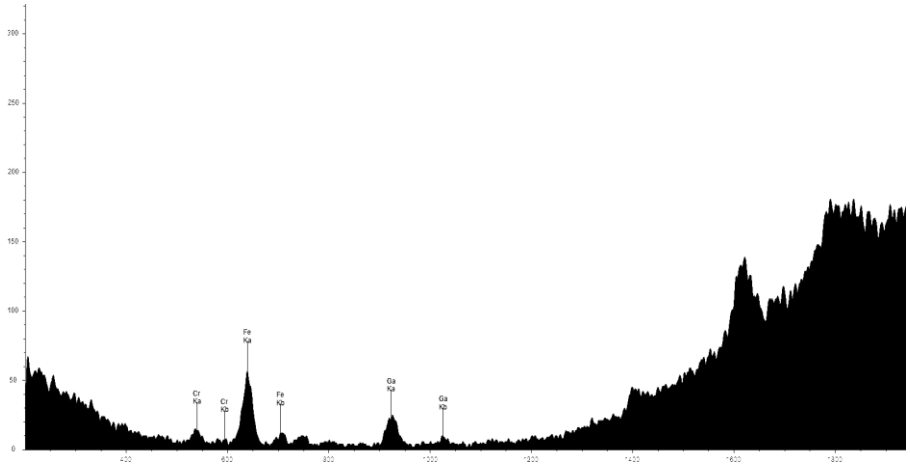
Infrared Spectroscopy

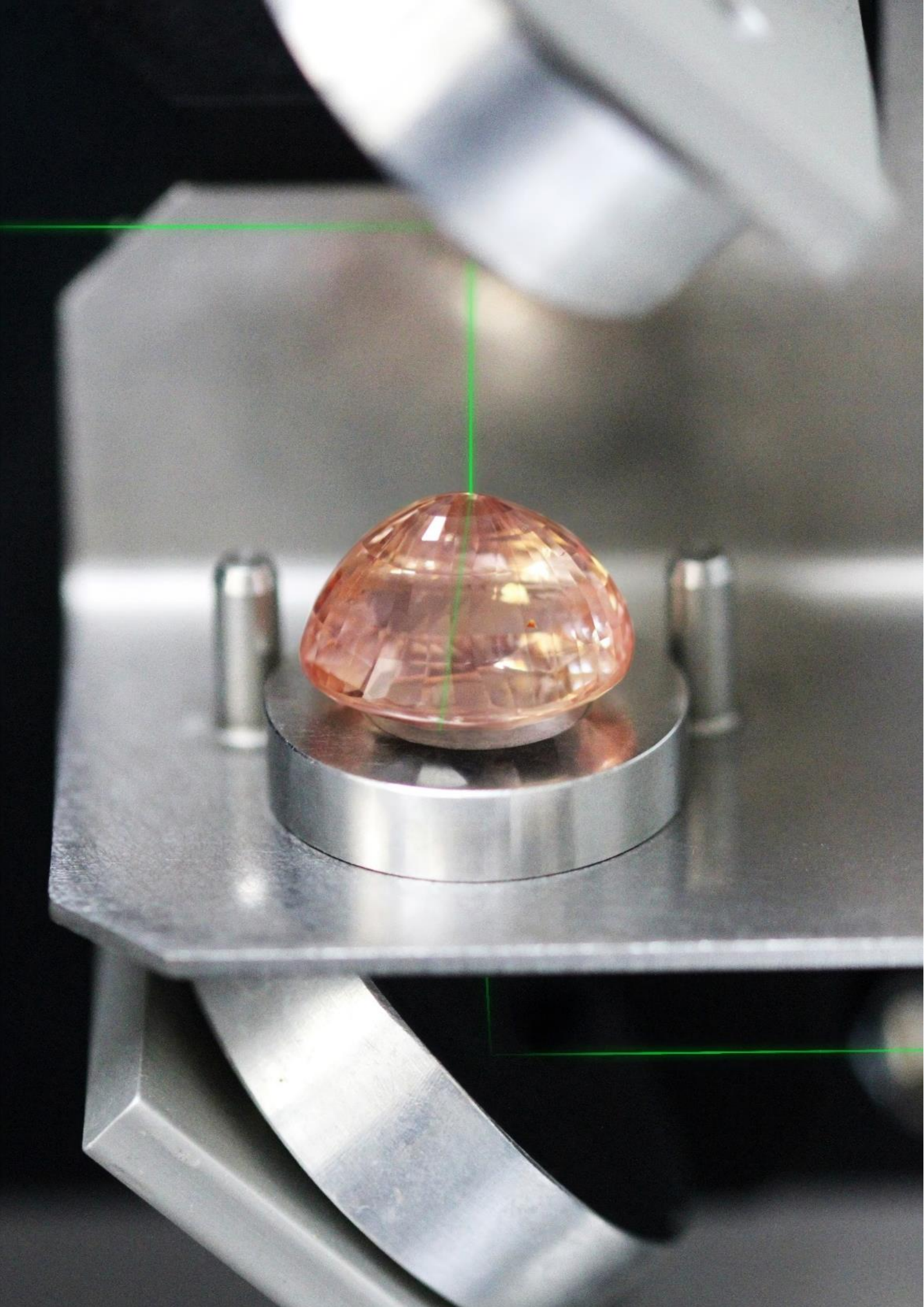
In the infrared region, spectral features generally arise from vibrations of molecular and structural components of the crystal. For example, carbon in diamond and water, when present in a gemstone, have characteristic signals in the infrared. It can be used to help distinguish one gem material from another or to detect certain types of treatments. The infrared region of the electromagnetic spectrum is the energy range just beyond the red end of the visible spectrum. The unit by which infrared energy is usually measured is the wavenumber (number of waves per centimeter), which is expressed in reciprocal centimeters (cm^{-1}) (Stockton, 1987).



Chemical Fingerprinting

The chemical fingerprint of a sapphire reflects the geological and mineralogical environment, such as the composition of mineralizing fluids, host rock composition, and the temperature and pressure conditions at the time of its formation. It is the content and ratios of the relevant elements (e.g., chromium, vanadium, iron, titanium, and gallium) that define the chemical fingerprint of sapphires from different geographic origins and/or different geologic-genetic environments.





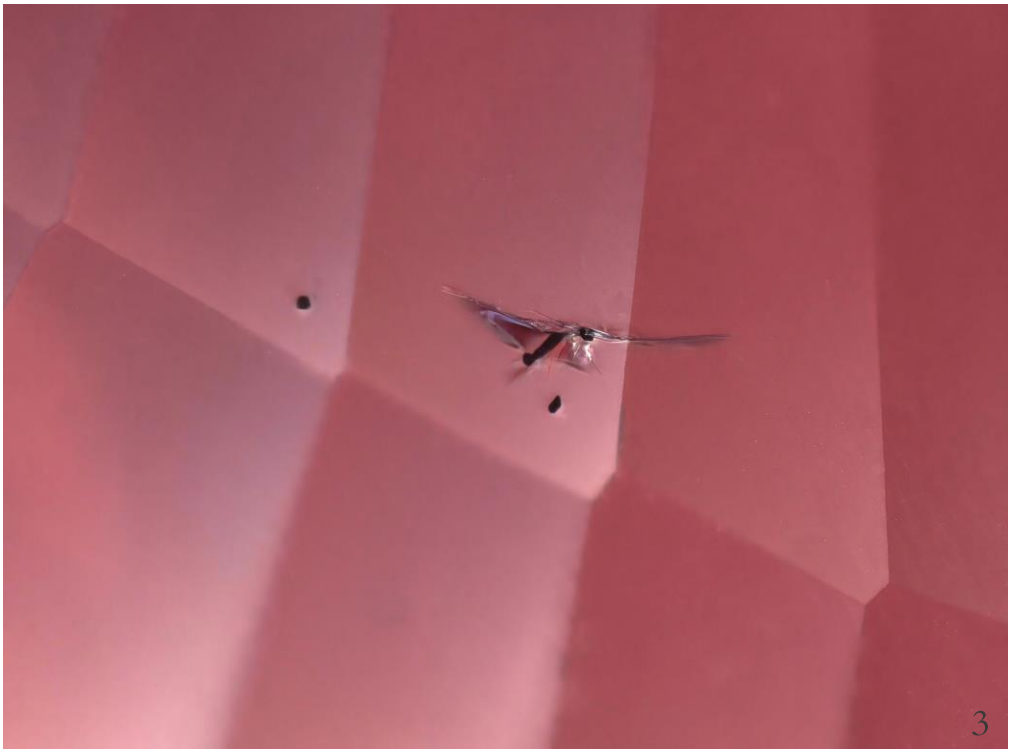
INTERNAL FEATURES

- Every gemstone is a reflection of its inner world.


1

The gemological microscope is widely considered one of the most useful tools in a gemological laboratory. With a high-quality microscope and multiple illumination techniques, an experienced gemologist can make detailed observations and highly accurate assessments. Among the properties used for the characterization of colored gemstones, the interpretation of internal features is generally speaking still the most common and most important routine examination for the gemologists at Bellerophon Gemlab. The precise description and identification of sapphire inclusions is an important tool in distinguishing between genuine and synthetic sapphires, as well as in determining the geographic origin of natural sapphires. The study and documentation of inclusion phenomena under the gemological microscope are essential and form an integral part of the testing procedures for colored gemstones. Our Keyence VHX-7000 digital microscope is an invaluable tool in our gemological laboratories, offering exceptional imaging capabilities. With magnification levels up to 2500x, it allows for the detailed examination of internal features that might be invisible under standard magnification. Its advanced optics and high-resolution imaging system produce crystal-clear photographs, making it ideal for documentation, analysis, and presentation of microscopic inclusions in gemstones.


2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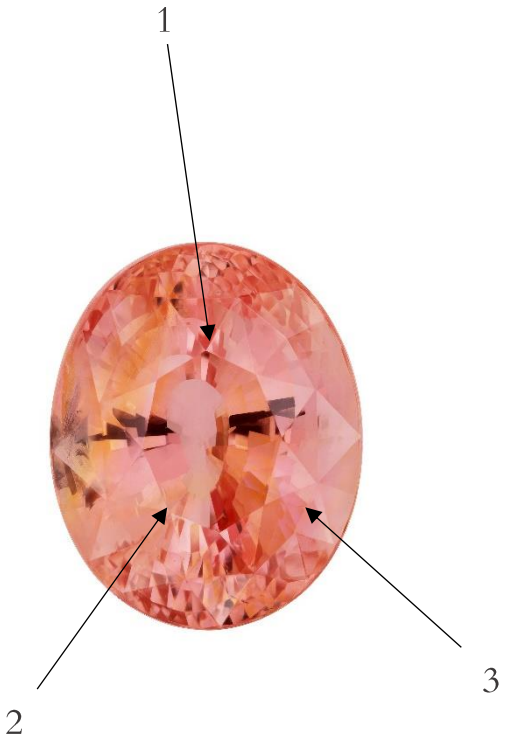
INTERNAL FEATURES MAPPING



SHAPE & CUT

> - "The cutting of a gem has to be finished before you can see whether it shines."
>
> _ Leonard Cohen

Cutting rough sapphire presents numerous challenges. The color of the stone can be uneven, so the master cutter must choose an orientation in which the finished stone will display an even face-up color. Sapphire is pleochroic, meaning its overall color changes depending on the crystal axis. This optical property demands precision, as a misaligned cut can dull the gem's vibrancy or reveal unwanted hues, diminishing its appeal.

Moreover, the presence of inclusions or zoning bands of color variation requires the cutter to balance maximizing carat weight with achieving optimal clarity and color distribution, often sacrificing portions of the rough stone. These challenges test even the most experienced lapidaries, as a single error can transform a potentially stunning gem into a lackluster one.

The present gemstone displays particularly good brilliance and proportions, achieved through the skillful cutting of the sapphire. The degree of lapidary craftsmanship adds value to the quality of this sapphire and contributes to its well-pronounced color. A well-cut stone not only enhances its visual allure but also elevates its market worth, as the precision of facets amplifies light return, creating a mesmerizing play of sparkle and depth. For rare varieties like Padparadscha, expert cutting can mean the difference between a gem that merely exists and one that commands awe, making the cutter's artistry as valuable as the stone's natural rarity.

Bellerophon | Gemlab

We are an independent gemological laboratory, created to serve you in your pursuit of truth in the fascinating, multifaceted world of gemology.

We prefer to think of ourselves as more than just a gemological laboratory. We are pioneers on a new frontier where higher standards, transparency, and integrity meet.

With three state-of-the-art laboratories located in **Place Vendôme, Paris, France, Bangkok, Thailand,** and **Colombo, Sri Lanka,** we are actively creating opportunities to further improve quality and set higher standards in our industry worldwide.

- State-of-the-art technologies
- Highly qualified gemologists
- Comprehensive reference collection
- Unique combination of expertise
- Expert system assistance
- Complete transparency

Laboratories & Technology

Bellerophon Gemlab has advanced significantly thanks to successful partnerships with leaders in fields such as artificial intelligence, photography, optics, luminescence spectroscopy, IT, engineering and universities. These collaborations have created new opportunities to better serve our customers worldwide and to establish a paragon of excellence. Our research center is equipped with state-of-the-art instruments, heating furnaces, cutting facilities, oiling facilities used exclusively for research and development in enhancement authentication and origin determination.

- Raman Spectroscopy / Micro-Raman Spectroscopy
- Photoluminescence Spectroscopy (365 nm, 532 nm & 708 nm)
- Ultraviolet-Visible-Near Infrared (UV-Vis-NIR) Spectroscopy
- Fourier Transform Infrared (FTIR) Spectroscopy
- Energy-Dispersive X-ray Fluorescence (EDXRF)
- Laser-Induced Breakdown Spectroscopy (LIBS)
- Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS)
- Keyence VHX-7000 Digital Microscope
- Excitation-Emission Matrix (EEM) Spectroscopy

Our Team

Founder & CEO of Bellerophon Gemlab Group | **M.P.H Curti**

M.P.H Curti, Graduate Gemmologist is the director of Bellerophon since august 2018. Started his career as a gemstone cutter in Burma (Myanmar). Worked in Mozambique with Gemfields. Later traveling to many gems deposit and gem centers in Asia, Africa, Europe, and America. Assisted with the discovery of a new mineral, worked with GRS, Thailand, and featured in a GIA article about the discovery of a new gem deposit.

Partner & Director Bangkok | **T. Rozet**

T. Rozet, Advanced Training Course from SSEF and Gemmologist from Gem-A (GA) is the Bangkok Managing Partner of Bellerophon Gemlab BOI. Successfully finished the intense gemological program with a detailed approach to identifying treatment and origin of ruby, sapphire, and emerald.

Gemmologist & Director Paris | **Dr.G. Musilli**

G. Musilli is a doctor in Earth Science, with specialization in Crystallography, Petrography and Mineralogy from the University of Milan coupled with a bachelor in Geoscience from the University of Turin. Her thesis on Ethiopian Emerald received the best year thesis award "Ernesto Fea". She is currently a gemmologist in the Paris team.

Gemmologist Bangkok | **V.F Fejoz**

Valentin Fejoz, Gemmologist specialized in spectrometry and inclusions in gemstones, and a graduate gemmologist from Gem-A (GA), is dedicated to providing precise analyses of gemstones. He has completed extensive training in gemology, with a focus on understanding the internal characteristics and origins of various gemstones through advanced techniques.

Gemmologist Paris | **E. Marlin**

E. Marlin is the Laboratory manager and a Gemmologist of Paris, holder of the FGA diploma, worked for Cartier Paris, she is a dedicated member of our team with a specialty in analytical operation. She interprets data on instruments such as FTIR and Raman micro spectroscopy.

Research Analyst & Gemmologist Colombo | **A.B.L ARSAC**

A.B.L Arsac is the research analyst, a dedicated member of our team with a specialty in analytical operation. He operates instruments such as EDXRF and Raman spectroscope. He provides gemmologists with the required data collection, and study gemology.

Reference Collection

Comparative analysis is conducted using one of the most comprehensive databases in gemology a reference collection of more than 9,000 samples, including most known gemstones, all known synthetics ever produced, all recorded enhancements, and over 4,000 gem-quality samples for origin determination of Spinel, Chrysoberyl, Opal, Emerald, Ruby, Sapphire... More than 30 countries of origin are represented in this collection.

Identification: Over 600 minerals recorded

Genesis: Comprehensive collection of all synthetic beryl and corundum

Treatment: All known treatments for all major gemstones documented

Origin Determination: Over 4,000 samples for geographic origin analysis