展覽 EXHIBITION

Journey with Minerals

礦石奇珍

L'ÉCOLE
School of Jewelry Arts

Supported by
Van Cleef & Arpels

Pyrite, quartz
Boldut Mine, Cavnic, Maramureş County, ROMANIA
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 82986)
© Musée de Minéralogie Mines Paris - PSL / L'ÉCOLE, School of Jewelry Arts
Photo: Benjamin Chelly

黃鐵礦、石英
羅馬尼亞馬拉穆列什縣卡夫尼克 Boldut 礦場
巴黎高科礦業學院礦物學博物館收藏 (ENSMP 82986)
©巴黎高科礦業學院礦物學博物館 / L'ÉCOLE, School of Jewelry Arts
圖片：Benjamin Chelly

MINES PARIS | PSL

Journey with Minerals
礦石奇珍

策展人
Curated by

Eloïse Gaillou
巴黎高科礦業學院礦物學博物館總監及策展人
Director of the Mineralogy Museum of Mines Paris - PSL

Didier Nectoux
地質學家及巴黎高科礦業學院礦物學博物館前總監
Geologist and former Director of the Mineralogy Museum of Mines Paris - PSL

目錄
CONTENTS

藍銅礦
中國廣東省
巴黎高科礦業學院礦物學博物館收藏(ENSMP 42316)

AZURITE
Guangdong, China
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 42316)

導言

狩獵工具、繪畫顏料、軍工武器、護身靈符……礦石發揮不同作用，而在數千年間，它一直停留在經驗主義的認知層面。早在文明誕生以前，這個動植物以外的領域，經已啟發史前人類族群無窮想像，石器時代（約公元前270萬年至前3000年）至青銅時代（約公元前3000年）的考古發現，提供了大量有力的佐證。

羅馬學者老普林尼（Pliny the Elder）在古典名著《博物志》（*Natural History*）中，嘗試拆解自然萬象的奧秘，特別是藏在地殼深處的秘密。他在書中最後兩章（第36及37章）集中探討礦石、大理石和寶石，但當時礦物學仍未成為專門名詞及科學學科。

世世代代的學者和收藏家，也曾試圖為礦石和寶石分門別類，但以現有方式研究礦物內在結構，則始於十九至二十世紀之交。是次展覽與巴黎高科礦業學院礦石學博物館合辦，將帶領觀眾踏上精彩旅程，透過「物質」、「珠寶」、「科技」、「藝術」和「太空」五個策展主題，發掘這些地質奇觀的種種特性和美態。

本展覽探討寶石世界與珠寶藝術的連繫，秉承 L'ÉCOLE 珠寶藝術學院自 2012 年成立以來的宗旨。學院在高級珠寶世家 Van Cleef & Arpels 梵克雅寶鼎力支持下成立，足跡遍及歐洲、亞洲及中東，透過課程、講座、出版刊物及展覽，將珠寶文化弘揚四方。

Lise Macdonald,
L'ÉCOLE 珠寶藝術學院院長
President of L'ÉCOLE, School of Jewelry Arts

Nicolas Bos,
全球總裁及首席執行官
President and CEO of Van Cleef & Arpels

FOREWORD

Used as tools for hunting or pigments for painting, converted into weapons or amulets, rocks have been a part of our empirical understanding for millennia. This non-animal and non-vegetal realm fascinated prehistoric communities even before the rise of civilizations, as witnessed by finds dating from the Stone Age (roughly 2.7 million years BCE–3000 BCE) to the Bronze Age (circa 3000 BCE).

In his famous work, *Natural History*, the Roman author Pliny the Elder attempted to unravel the mysteries of the world, particularly those hidden underground in the depths of Earth's crust. He dedicated his final chapters, chapters 36 and 37, to stones, marbles, and gems, but Mineralogy as a term and as a field of scientific study was yet to be created.

Scholars and collectors made many attempts to classify stones and gems, but the study of minerals' internal structures, as we know it today, only started at the turn of the 20th century. This exhibition, in partnership with the renowned Mineralogy Museum Mines Paris - PSL, explores the many properties and the beauty disclosed by such geologic wonders, with a curatorial path divided into five thematic journeys through Matter, Jewelry, Technology, Arts, and Space.

By contemplating the links between the world of gemstones and jewelry arts, this exhibition resonates with the mission pursued by L'ÉCOLE, School of Jewelry Arts since its creation in 2012, with the support of Van Cleef & Arpels. With a presence in Europe, Asia and the Middle East, L'ÉCOLE spreads jewelry culture to the widest possible audience through courses, talks, books and exhibitions.

黃鐵礦、石英

PYRITE, QUARTZ

這件貌似來自天外的標本，其實是不折不扣的地球產物！它由黃鐵礦（金黃色）和石英（奶白色）兩種原生礦物天然聚合而成。無數細小的黃鐵礦立方體堆疊起來，形成近乎完美的球體，只有小心觀察，方可察覺這些立方晶體的邊角。

This specimen looks like something from out of this world—but it isn't! It is a natural assemblage of two primary minerals: pyrite (golden yellow) and quartz (milky white). The almost perfect sphere is made of small cubes of pyrite stacked so only the edges are visible.

黃鐵礦、石英
羅馬尼亞馬拉穆列什縣卡夫尼克Boldut礦場
巴黎高科礦業學院礦物學博物館收藏（ENSMP 82986）

PYRITE, QUARTZ
Boldut mine, Cavnic, Maramureş County, Romania
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 82986)

物質揭秘之旅

A JOURNEY THROUGH *MATTER*

那些完美的幾何形狀，到底是天然還是人工產物？

很多人誤以為礦石的各種形狀，諸如四方形、角錐、三角形、角柱體或六邊形等，皆是人為雕琢而成。其實，礦物是天然無機的晶質固體，由具周期性且有序重複排列的原子構成。

礦物可按原子基本排列格式所重複呈現的形狀（稱為晶格）劃分為七大晶系。每一種礦物均有獨特的化學結構和晶體序列，構成獨有的物理和化學特性。

巴黎高科礦業學院博物館首任館長勒內-朱斯特·阿維（René-Just Haüy）修士長，在其1801年編寫的《礦物學守則》（*Mineralogy Treaty*）中定義了晶系，推斷礦物如何從原有的晶體結構系統，形成各種不同形狀。直至二十世紀初，人類才首次透徹理解原子的概念，晶格亦得以清楚地分類和定義。

本部分的展覽以黃鐵礦（一種硫化鐵）為例子，解構立方晶系，其結晶結構呈現出兩種獨特的形狀：八面體和十二面體；而方解石（一種碳酸鈣）則以平行六面體的形狀，呈現原有的六面體，以作為三方晶系（也稱為菱面體晶系）的例子，同場亦有具十二個不等邊三角形的不等邊面體組合。

最後，一塊巨型藍色氟磷灰石展品（一種氟磷酸鈣），則讓公眾窺探六方晶系的底蘊。

方解石
馬達加斯加
巴黎高科礦業學院礦物學博物館收藏（ENSMP 82935）

CALCITE
Madagascar
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 82935)

Are these perfect geometric shapes natural or man-made?

It is easy to mistake minerals with forms and shapes such as squares, pyramids, triangles, prisms, or hexagons for man-made artifacts. However, minerals are natural inorganic crystalline solids, composed of atoms that stack together in an ordered and periodic arrangement.

Minerals can be categorized into seven crystal systems, which are repeated by the primary group of atoms (known as a crystal lattice) to form long repeating patterns. Each mineral is identified by its chemical composition and the specific crystal arrangement which gives it its unique physical and chemical properties.

In his *Mineralogy Treaty* published in 1801, Abbot René-Just Haüy, the first curator of the Mineralogy Museum of Mines Paris - PSL, defined crystal systems, deducing the many shapes that a mineral could take from its original system. It wasn't until the early 20th century that the concept of atoms was fully understood and the crystal lattice was defined.

For this chapter, pyrite (an iron sulfide) has been chosen to represent the cubic crystal system, with two distinctive single forms: an octahedron (with eight faces) and a dodecahedron (with twelve faces). Calcite (a calcium carbonate) displays its original six faces in the form of a parallelepiped and is an example of the trigonal system (also known as the rhombohedral system), along with the scalenohedron combination with its twelve scalene triangles.

Finally, a large blue fluorapatite (a fluorine-based calcium phosphate) illustrates the hexagonal system.

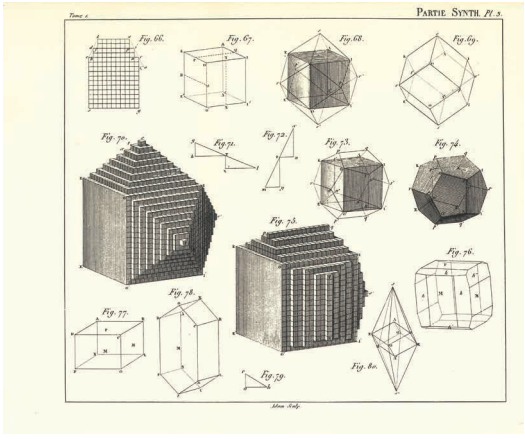
黃鐵礦
PYRITE

此黃鐵礦（硫化鐵）的大型標本由三個立方體自然堆疊而成，呈現立方晶系結構（又稱等軸晶系）。立方體是立方晶系最常見的結晶習性（指晶體生長的慣態），而按勒內-朱斯特·阿維（René-Just Haüy）修士長所述，此晶系下亦有其他結晶習性，例如：八面體和十二面體。

This large specimen of Pyrite (FeS_2) shows the cubic (or “isometric”) crystal system, with its three cubes naturally appearing piled-up together. If the cube is the most recognizable habit (crystal form) that a cubic mineral can display, other habits, such as octahedrons and dodecahedrons, are also possible, as described by the abbot René-Just Haüy.

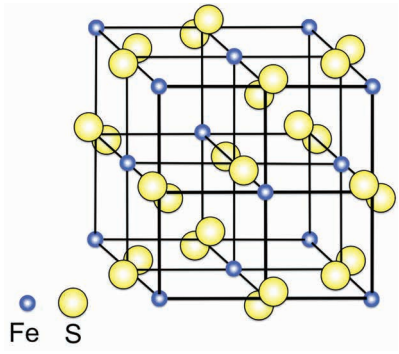
黃鐵礦
西班牙拉里奧哈區納瓦瓊
巴黎高科礦業學院礦物學博物館收藏 (ENSMP 16715)

PYRITE
Navajun, La Rioja, Spain
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 16715)



單晶及菱面體晶系的繪圖
《礦物學守則》，勒內-朱斯特·阿維修士長著，1801年
巴黎高科礦業學院圖書館

Drawings of single crystal and cubic system
from *Traité de Minéralogie* (Mineral Treaty) by René-Just Haüy, 1801
Library of Mines Paris – PSL, Paris



黃鐵礦（FeS_2）的晶體結構圖，一種結晶為立方晶系的硫化鐵

Drawing of the crystal structure of pyrite, an iron sulfide (FeS_2), crystallizing in the cubic system

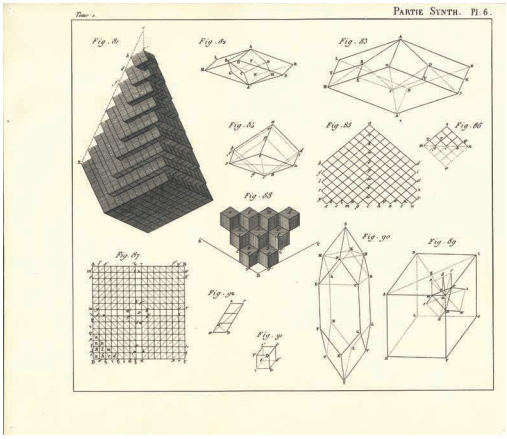
方解石
CALCITE

晶瑩通透的方解石（碳酸鈣）晶體是三方晶系的鮮明例子，它所呈現的原始菱面體狀，最早由勒內-斯特·阿維（René-Just Haüy）修士長於1801年記述。方解石最常見的晶癖為雙尖的偏三角面體，而展品中偏三角面體的砂岩色標本，則是由許多細小的菱面體狀的方解石晶體堆疊而成。

This translucent calcite ($CaCO_3$) crystal is a remarkable example of the trigonal crystal system and shows the primitive rhombohedron, first described by the Abbot René-Just Haüy in 1801. A common combination habit is the so-called scalenohedron which features a double point. Note that in this sand-colored specimen on display in the exhibition, the general scalenohedron habit is obtained by the piling-up of many small rhombohedral crystals of calcite.

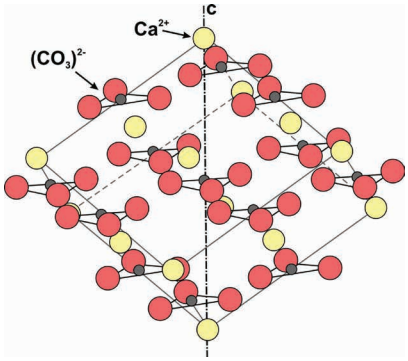
方解石
馬達加斯加
巴黎高科礦業學院礦物學博物館收藏（ENSMP 82935）

CALCITE
Madagascar
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 82935)



單晶及立方體晶系的繪圖
《礦物學守則》，勒內-朱斯特·阿維修士長著，1801年
巴黎高科礦業學院圖書館

Drawings of single crystal and rhombohedral system
from *Traité de Minéralogie* (Mineral Treaty) by René-Just Haüy, 1801
Library of Mines Paris – PSL, Paris



方解石($CaCO_3$)的晶體結構圖，一種結晶為三方晶系的碳酸鈣。
繪圖：Samuele Papeschi/GW

Drawing of the crystal structure of calcite, a calcium carbonate($CaCO_3$) crystallizing in the trigonal crystal system. Graphics: Samuele Papeschi/GW

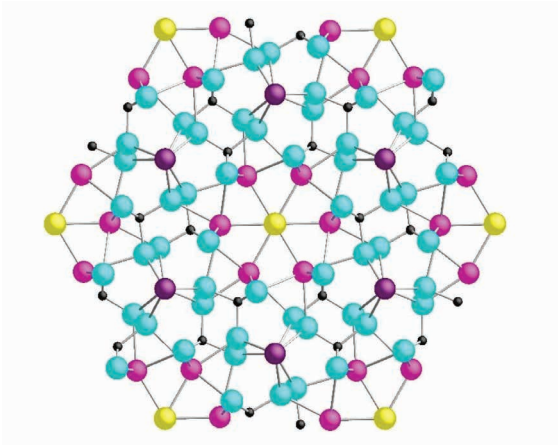
氟磷灰石
FLUORAPATITE

這顆氟磷灰石（氟磷酸鈣）晶體非常奪目動人，而它所呈現的罕有電藍色，是產自巴西巴伊亞州伊皮拉的礦石特色。如若仔細觀察，不難察覺晶體上的稜角其實是六個晶面的交接點，那是六方晶系礦物典型的特性。

This impressive fluorapatite ($Ca_5(PO_4)_3F$) crystal is made spectacular by its unusual electric blue color, which is characteristic of the Ipira complex in the Bahia state of Brazil. By looking carefully, one might notice that the point is joined by six faces—typical for a mineral crystallizing in the hexagonal system.

氟磷灰石
巴西巴伊亞州伊皮拉
巴黎高科礦業學院礦物學博物館收藏（ENSMP 82989）

FLUORAPATITE
Ipira, Bahia, Brazil
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 82989)



氟磷灰石 ($Ca_5(PO_4)_3F$) 的晶體結構圖，一種結晶為六方晶系的氟系磷酸鈣
© John Rakovan

Drawing of the crystal structure of fluorapatite ($Ca_5(PO_4)_3F$) a fluor-based calcium phosphate crystallizing in the hexagonal crystal system © John Rakovan

珠寶
揭秘之旅

A JOURNEY THROUGH *JEWELRY*

我們或許認為，將礦石切割、打磨，並鑲嵌成高級珠寶，對原石來說可能是最徹底的昇華。然而，並非所有礦石都適合用作裝飾品。

一顆礦石如果外表美觀、堅硬得可以經受切割，並足夠耐用，能鑲嵌於手鐲、戒指或耳環上作日常配戴，就有條件成為寶石。它必須珍稀罕有，令人趨之若鶩，但又不至於稀少得難以滿足需求。此外，色彩濃度、淨度，以及寶石的切割，亦是其中幾項決定寶石品質的因素。

哪些礦石最能啟發珠寶匠？

美麗和珍貴的定義會隨潮流和品味而改變，但珠寶匠一直鍾情的珍寶可說是意料之內，如鑽石、剛玉（紅寶石和藍寶石）、拓帕石、綠柱石（海藍寶石、祖母綠等）、碧璽和石英（紫水晶、黃水晶等）。然而，即使是象徵性稍遜的礦石，依然可以在珠寶世界佔一席位，包括歐泊、石榴石、坦桑石和月長石等。此外，亦有其他種類的礦石原石標本（如菱錳礦、藍錐礦、藍方石等）落入藏家手中，它們的稀有性、抵抗力和耐用度異於寶石，亦令它們難以用於珠寶鑲嵌。

最後，一些深藏不露的礦物，如金、銀、銅和錫，則透過冶金工藝成為珠寶素材。它們均採自地底礦床，再在鑄造廠以人工鑄成合金。

We might consider that the ultimate end for a mineral would be to be cut, polished, and set in a piece of high jewelry. However, not all minerals are suitable for use in ornaments.

A mineral is a good candidate for a gemstone if it is beautiful and durable enough to be faceted and then worn daily on bracelets, rings, necklaces, or earrings. It must be rare enough to be desirable, but not so scarce that its shortage could render the ability to meet demand uncertain. Moreover, the intensity of a gemstone's color, its purity, and the way it has been cut are a few of the parameters that determine its quality.

What mineral families have inspired jewelers the most?

The definition of what is precious and beautiful has evolved as fashions and taste have changed. Nevertheless, jewelers have always favored the expected treasures such as diamond, corundum (ruby and sapphire), topaz, beryl (aquamarine, emerald, etc.), tourmaline, and quartz (amethyst, citrine, etc.). However, some less emblematic minerals may also find places on jewelry, namely opal, garnet, tanzanite, moonstone, etc. Many specimens (rhodochrosite, benitoite, hauyne, etc.) simply fall into the hands of gemstone collectors; their rarity, resistance and durability setting them apart, also makes them unsuitable for jewelry use.

Last but not least, less visible minerals such as gold, silver, copper, and tin are also used in the metalsmithing component of jewelry making. These are all extracted from underground deposits and made into alloys in foundries.

綠柱石：海藍寶石
巴西米納斯吉拉斯州瓦拉達里斯州長市
巴黎高科礦業學院礦物學博物館收藏（ENSMP 11067）

BERYL: Aquamarine
Governador Valadares, Minas Gerais, Brazil
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 11067)

玉
JADE

玉的多重面貌

這兩塊經過拋光打磨的軟玉從同一座獎座分拆下來。獎座由讓-皮埃爾·阿里伯特（Jean-Pierre Alibert）（1820-1905）於1867年贈予巴黎高科礦業學院，紀念他發現烏拉爾玉石（Ural jade）及石墨礦藏。較大的一塊呈濃艷的墨綠色，在強光下更美不勝收。同場展出一塊厚重並經拋光的淡綠色軟玉，彰顯軟玉豐富多變的色澤。另一塊大型拋光軟玉呈卵石狀，同樣由阿里伯特於十九世紀遊歷亞洲大陸時帶回歐洲。

玉石可分為軟玉和硬玉兩種，兩者均為礦石，即同樣由礦物聚合而成（普遍為細小的顆粒狀結晶）。硬玉主要由輝石類礦物（納、鋁和富含鐵的矽酸鹽）組成，而軟玉的主要成分則是透閃石和陽起石，屬角閃石類（鈣、鎂和富含鐵的矽酸鹽的氫氧化物）。

The many guises of jade

These two polished nephrite jade pieces come from a dismantled trophy, which was gifted to Paris School of Mines in 1867 by Jean-Pierre Alibert (1820-1905), to commemorate his discovery of the Ural jade and graphite deposits. The large slice features an intense green hue, which reveals its beauty under a strong light. A thick polished block of light green nephrite jade is also displayed in order to show the variety of shades that this material can be found in. The large, polished boulder of nephrite jade also comes from Alibert's travels in Asia in the 19th century.

There are two varieties of Jade: nephrite and jadeite. Both are rocks, meaning that they are composed of an aggregation of minerals (here, mostly in the form of small grains). The main component of jadeite jade is jadeite, a pyroxene group mineral (sodium, aluminum, and iron-rich silicate), while nephrite jade is mainly composed of tremolite and actinolite, which are amphibole group minerals (hydrated calcium, magnesium, and iron-rich silicates).

軟玉
俄羅斯烏拉山脈
J.-P. Alibert捐贈
巴黎高科礦業學院礦物學博物館收藏 (ENSMP Alibert)

NEPHRITE JADE
Ural Mountain, Russia
Gift of J.-P. Alibert
Collection of the Mineralogy Museum of Mines Paris – PSL
(ENSMP Alibert)

軟玉
俄羅斯布里亞特地區
J.-P. Alibert捐贈
巴黎高科礦業學院礦物學博物館收藏 (ENSMP 80026)

NEPHRITE JADE
Buryatia, Russia
Gift of J.-P. Alibert
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 80026)

綠柱石：海藍寶石 BERYL: Aquamarine

這塊海藍寶石屬「寶石級」晶體，意味它通體呈半透明或透明，綻放鮮艷迷人的藍綠色彩，天然晶狀近乎完美。此原石的天然晶面清晰可見，部分邊沿有條紋，晶體頂部結構完整。這塊採自巴西的綠柱石（海藍寶石為綠柱石其中一個品種）名副其實，呈現有如海水的色澤。它的重量達1,304克，即6,520克拉。

This aquamarine is a “gem quality” crystal, meaning that it is translucent or transparent, it has an attractive and intense green-blue color, and it has an almost perfect natural crystal shape. The natural faces of the crystal can easily be seen, with striations on some edges, and a perfect top. This Brazilian beryl gives meaning to the name of aquamarine, which refers to the color of seawater. It weighs 1,304 g, i.e., 6,520 carats.

綠柱石：海藍寶石
巴西米納斯吉拉斯州瓦拉達里斯州長市
巴黎高科礦業學院礦物學博物館收藏（ENSMP 11067）

BERYL: Aquamarine
Governador Valadares, Minas Gerais, Brazil
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 11067)

剛玉：紅寶石 CORUNDUM: Ruby

假如你曾經幻想寶石在自然環境中的形態，這件大理石上的紅寶石展品，就可讓你略窺一斑。緬甸或越南大理石礦藏所生產的紅寶石最為珍貴，這件標本正是一例。要採得數克紅寶石，必須開鑿數以噸計的白色大理石，而在沉積礦床進行開採相對容易：因為流水早已沖蝕河床母岩，並將大量紅寶石積聚於特定範圍。

If you have ever wondered what a gemstone looks like in nature, this ruby on marble gives you a glimpse of the answer. The most prized rubies originate from large marble deposits in Myanmar or Vietnam, like this specimen. Tons of white marble rocks must be mined to reveal just a few grams of rubies. Alluvial deposits are easier to exploit: the river has already broken down the host rock and concentrated the densest rubies in certain areas.

剛玉：紅寶石
越南安沛省陸安縣
巴黎高科礦業學院礦物學博物館收藏（ENSMP 46708）

CORUNDUM: Ruby
Luc Yen, Yenbai, Vietnam
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 46708)

電氣石
TOURMALINE

電氣石形態修長，色彩與淨度出眾，是地球上最具吸引力的礦物之一。難怪多種電氣石都被切割成寶石（即碧璽）並鑲嵌於珠寶上，尤其是粉紅色至紅色的碧璽，在寶石市場上更被稱為紅碧璽（Rubellite，意指「如紅寶石一般的」）。

Tourmalines are some of the most attractive minerals on Earth: they feature an aesthetic elongated shape combined with attractive colors and clarity. Unsurprisingly, some are cut to be set in jewelry, especially the pink and red ones, which are referred to as “rubellite” on the gem market.

鋰電氣石
馬達加斯加安塔那那利佛省貝塔富市安加那玻諾那
巴黎高科礦業學院礦物學博物館收藏（ENSMP 28973）

ELBAITE: Tourmaline
Anjanabonoina, Bétafo, Antananarivo, Madagascar
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 28973)

鈣鋁榴石
GROSSULAR: Garnet

這塊鈣鋁榴石的橙黃色調精緻優雅，來自晶體內含的微量錳元素，而明亮的橙色使它獲得「芬達」（Fanta）榴石的別稱。

The exquisite orange color of this grossular garnet is due to the presence of trace amounts of manganese. The brightest orange garnets are referred as “Fanta” garnets.

鈣鋁榴石
加拿大魁北克省埃斯特里區石棉鎮傑弗里礦
巴黎高科礦業學院礦物學博物館收藏（ENSMP 16837）

GROSSULAR: Garnet
Jeffrey Quarry, Asbestos, Estrie, Québec, Canada
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 16837)

科技揭秘之旅

A JOURNEY THROUGH *TECHNOLOGY*

人類發現金屬，是世界各地文明進程的重要里程碑。

科技日益進步，而金屬開採技術亦推陳出新。由紅銅時代（約公元前6000年）到青銅時代（約公元前3000年），以至後來的鐵器時代（約公元前1200年），我們在冶煉金屬方面獲得長足發展。十九世紀發現鋁合金和相關的礦物，更促使工業革命誕生。

今天，礦石和礦物的開發應用已成為社會進步和經濟增長不可或缺的一環。稀土、鈷、鋰、鉭和其他戰略金屬對新科技發展和能源轉型至關重要。礦物的世界激發無窮想像，造就大量工業發明。

The discovery of metals has played a crucial role in the development of civilizations around the world.

Over time, technology has evolved, and new methods have been developed for extracting metals. From the Copper Age (circa 6000 BCE) to the Bronze (circa 3000 BCE) and then the Iron Ages (circa 1200 BCE), we have come a long way. In the 19th century, the discovery of aluminum and its component minerals contributed significantly to the Industrial Revolution.

Today, the exploitation of rocks and minerals has become more important than ever to the growth and the advancement of our society. Rare earth metals, cobalt, lithium, tantalum, and other strategic metals are crucial to the production of new technologies and to the energy transition. The world of minerals is a fascinating one and one that has led to many industrial inventions.

銅
COPPER

這件礦石樣本完全由銅組成。在地球的岩漿作用和熱液作用影響之下，這種金屬元素得以被單體隔離，令人類更容易獲取。

全賴我們的先祖於自然環境中發現原生金屬（金、銀和銅），早期的人類文明才得以發展。銅迅即成為製造武器和日常工具的重要原料，下開紅銅時代。

This specimen is composed exclusively of copper. It is the mechanisms of planet Earth (magmatism, hydrothermalism) that have led to the natural isolation of this metal rendering it easily exploitable by humans.

The first civilizations developed thanks to the discovery of native metals (gold, silver, and copper) which are directly available in nature. Copper quickly became essential for making weapons and tools for everyday life marking the beginning of the Copper Age.

銅
美國亞利桑那州皮馬縣阿荷區新科尼利亞礦
巴黎高科礦業學院礦物學博物館收藏(ENSMP 5621)

COPPER
New Cornelia Mine, Ajo, Pima County, Arizona, USA
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 5621)

透視石
DIOPTASE

時至今日，人類對銅的需求依然有增無減。一輛電動車含有超過80公斤銅，較內燃引擎車多三倍。幸而含銅的礦物（銅礦石）量多且種類豐富，在逾150種銅礦石之中，又以黃銅礦、班銅礦和硫化銅最常被開採，另有透視石和赤銅礦等次生銅礦。

Today, the demand for copper is higher than ever. An electric vehicle contains more than 80 kg of copper, three times more than its combustion counterpart. Fortunately, copper-containing minerals (ores) are plentiful. There are more than 150 of them. Chalcopyrite, bornite, and copper sulfides are the main minerals exploited, along with secondary copper ores, such as dioptase and cuprite.

透視石
剛果共和國普爾省金達巴Renéville
巴黎高科礦業學院礦物學博物館收藏（ENSMP 16757）

DIOPTASE
Renéville, Kindaba, Pool, Republic of the Congo
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 16757)

藍銅礦
AZURITE

孔雀石和藍銅礦自古已被作為冶煉銅的素材。同時，它們因外表絢麗，被用作裝飾寶石，點綴工藝品和珠寶。此外，它們經過研磨，就能製成孔雀綠和天藍色的天然顏料。

Malachite and azurite have been mined for their copper. But these minerals are so beautiful that they have also been used as decorative stones to adorn objects and some pieces of jewelry. They have also been employed as natural pigments for painting: malachite green and azure blue.

藍銅礦
中國廣東省
巴黎高科礦業學院礦物學博物館收藏（ENSMP 42316）

AZURITE
Guangdong, China
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 42316)

藝術
揭秘之旅

A JOURNEY THROUGH *THE ARTS*

礦石種類繁多，各有不同的形狀、顏色和質感，有些呈現波浪的線條，也有形似山峰的尖刺。部分礦石擁有帶狀或條狀的分層紋理，讓它們具備啟發創作靈感的神秘特質，牽引不同領域的藝術家浮想聯翩，在建築、繪畫、雕塑和設計等界別創造出許多令人讚嘆的傑作。

在十七世紀，法王路易十四收藏多塊砂岩，名為「古哥特石」（Gogottes），其形似人體雕塑。與此同時，中國明、清兩代的文人雅士熱愛「供石」，在書房和花園擺放玩賞。這些迷人的礦石，外型大多酷似山水景致，對默觀和冥想多有裨益。

也有一些礦石標本外型奇特，甚至令人懷疑它們到底是藝術家的雕塑作品，抑或自然生成。有時，我們也難以斷言，究竟藝術家是從自然中獲得靈感，還是憑空創造出令人驚艷的嶄新作品。

Minerals come in a wide variety of shapes, colors, and textures, ranging from wavy lines to spikes that recalls mountain peaks. They can have banded or striped layers, which give them mystical features, and which have inspired artists in various fields such as architecture, painting, sculpture, and design to create amazing works.

During the 17th century, Louis XIV, the King of France, collected sandstone concretions known as "Gogottes," which had sculptural silhouettes reminiscent of the human body. In the same vein, scholars during the Ming and Qing dynasties in China were fascinated with "*Gongshi*" rocks and displayed them in their studios or gardens. These beguiling mineral formations often resemble landscape scenery and are perfect for meditation and contemplation.

Some mineral samples are so extraordinary that they look like they were created artificially, making us wonder if an artist sculpted them or if they occur naturally. Sometimes, it is hard to tell if an artist was inspired by a natural formation or if they have simply created something entirely new to awe us.

石英：縞瑪瑙
產地不詳
巴黎高科礦業學院礦物學博物館收藏（ENSMP 1202）

QUARTZ: Onyx
Unknown origin
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 1202)

海泡石
SEPIOLITE

這類黏土礦物可形成的結節狀聚合物，輕盈得可於水中飄浮，因而得名「海泡石」，其英文名稱「meerschaum」源自德語，解作「海水的泡沫」。海泡石另一英文名稱「sepiolite」來自希臘文的「sêpion」，解作「烏賊骨」。這些結塊源自土耳其埃斯基謝希爾（Eskisehir）的礦藏，一旦脫離地表，這些礦物隨即呈現意想不到的形狀，造型恍如人工雕塑。

這件標本教人不得不聯想到舊石器時代的塑像《韋倫道夫的維納斯》（Venus of Willendorf）或波特羅（Botero）的藝術作品。

This clay mineral can aggregate into very light nodular masses that float on water. This is why it has been named *Meerschaum,* derived from the German word meaning “foam of the sea.” The name sepiolite comes from the Greek *sêpion,* meaning “cuttlebone.” The nodules are found in the Eskisehir deposit in Turkey, and, once removed from the Earth’s crust, they display some astonishing shapes which evoke man-made sculptures.

At the sight of this specimen, one cannot help but think of a Paleolithic Venus (such as the Venus of Willendorf) or a work by Botero.

海泡石
土耳其埃斯基謝希爾省米哈勒彻克區Killik
巴黎高科礦業學院礦物學博物館收藏（ENSMP 6280）

SEPIOLITE
Killik, Mihaliççik District, Eskişehir Province, Turkey
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 6280)

韋倫道夫的維納斯，距今約25000年
鮞粒灰岩
奧地利維也納自然史博物館

Venus of Willendorf,
circa 25000 BP
Oolitic limestone
Natural History Museum Vienna, Austria

輝銻礦
STIBNITE

這塊輝銻礦（一種硫化銻）聚合成針狀，呈現完美的幾何結構，為無數設計師提供創作靈感。1977年，建築師菲利普·約翰遜（Philip Johnson）取其美學元素，創造出美國加州加登格羅夫（Garden Grove）「水晶教堂」（Crystal Cathedral）的鐘樓。

The needle-like assemblages of this stibnite, an antimony sulfide, appear to be perfect geometrical constructions and have served as a source of inspiration for designers. The architect Philip Johnson employed a similar aesthetic when creating the bell tower for the "Crystal Cathedral" in Garden Grove, California, in the United States in 1977.

輝銻礦
日本愛媛縣西条市市之川礫岩礦
巴黎高科礦業學院礦物學博物館收藏（ENSMP 1574）

STIBNITE
Ichinokawa Mine, Saijo, Ehime, Japan
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 1574)

歐泊
OPAL

這塊超凡的墨西哥歐泊儼如人臉，酷似美國藝術家尚·米榭·巴斯奇亞（Jean-Michel Basquiat）想像出來的面譜。法國散文家和學者羅歇·凱盧瓦（Roger Caillois）醉心於「形狀、外觀或色彩獨特，因而引人注目的珍奇石頭」，他收藏的石頭又以瑪瑙為主。他從中獲得靈感，繼而撰寫數篇文章，這些文章均被收錄於《Stones》、《The Writing of Stones》及《Paradoxical Agates》中，堪稱經典。細賞這塊縞瑪瑙樣本，我們不難如這位出色的作家一樣，聯想到爬蟲類神秘的眼睛。

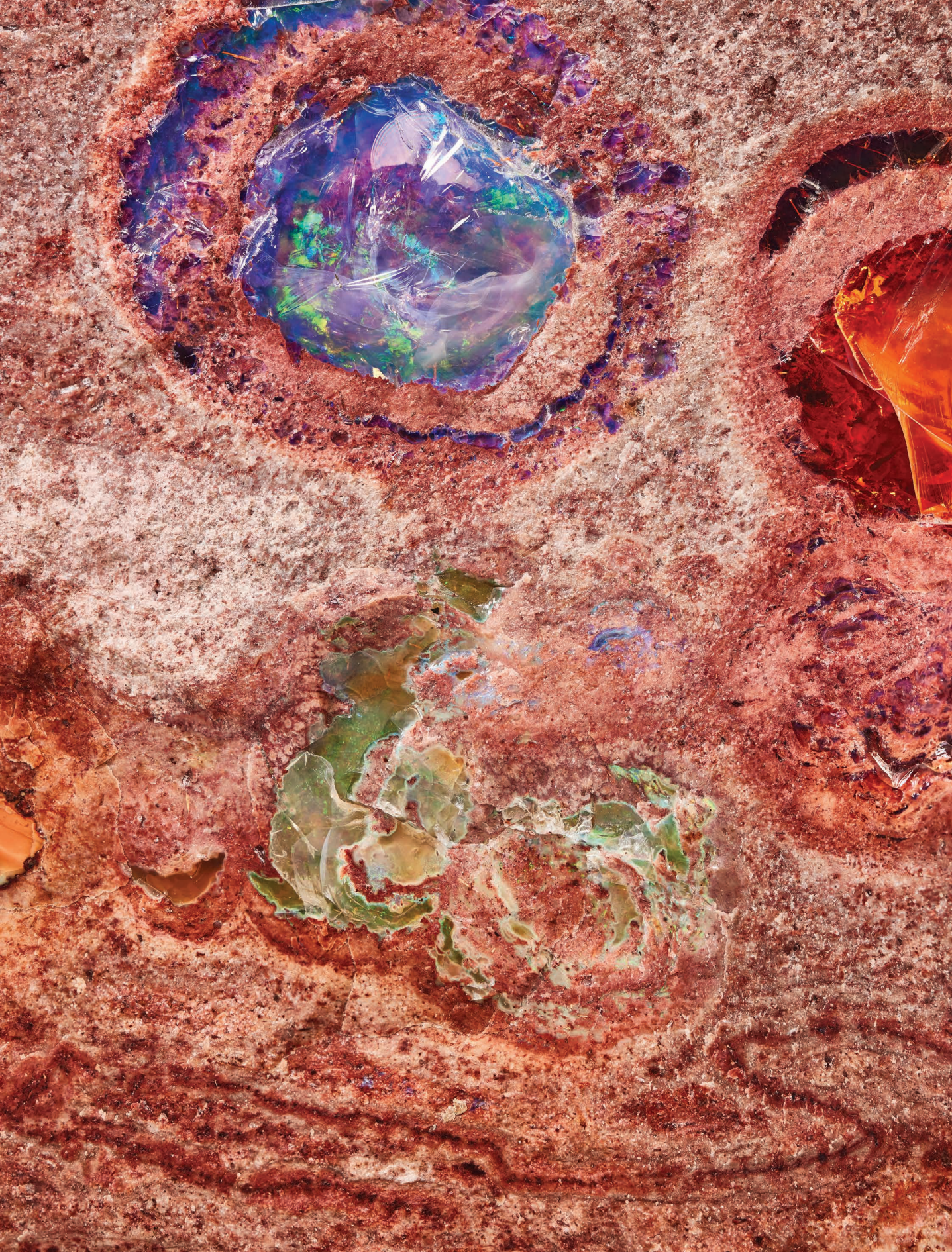
This extraordinary Mexican opal evokes a face that could be straight out of the imagination of the American artist Jean-Michel Basquiat. Roger Caillois, a French essayist and academic, was passionate about these "curious stones, which attract attention by some anomaly in their shape or by some significant oddity of design or color." He is the author of a number of famous texts collected in *Stones, The Writing of Stones* and *Paradoxical Agates* which are directly inspired by his collection, in large part made up of agates. Like this great writer, one thinks of the hypnotic eyes of a raptor when observing this onyx specimen.

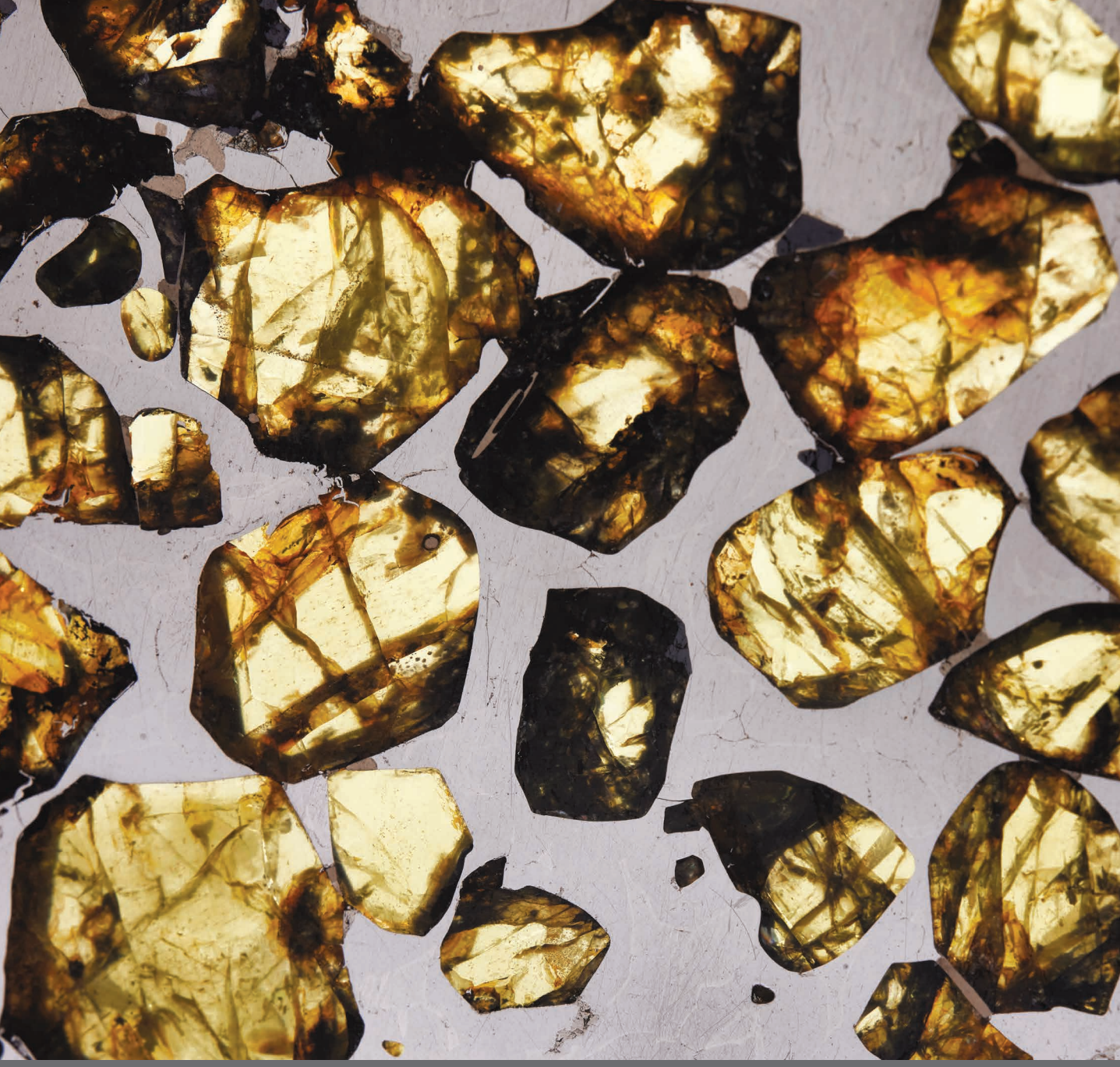
石英：縞瑪瑙
產地不詳
巴黎高科礦業學院礦物學博物館收藏（ENSMP 1202）

QUARTZ: Onyx
Unknown origin
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 1202)

流紋岩中的歐泊結核
墨西哥
巴黎高科礦業學院礦物學博物館收藏（ENSMP 16209）

OPAL nodules in Rhyolite
Mexico
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 16209)





太空
揭秘之旅

A JOURNEY THROUGH *SPACE*

無論是地球、其他行星以至小行星上的岩石，基本上都是由礦物組成。來自外太空的隕石，為太陽系的起源提供佐證。球粒隕石（chondrites）就是由太陽系初期產生的微塵和小顆粒積聚而成，它促成這顆45.6億歲「原始」小行星的誕生。其他隕石則是大型小行星形成原行星後殘餘的部分。

這些原行星經過熔融的過程，內部出現分化現象，形成含豐富矽酸鹽的地殼、蘊藏大量矽酸鹽和鐵的地幔，以及富含鐵的地核。這些不同成份的部分碎片，包括無粒隕石（achondrites）、橄欖隕鐵（pallasites）和隕鐵（siderites），偶爾會墜落地球。隕石墜落地球可產生強烈的撞擊力，令地表周圍的岩石碎裂和熔化，形成巨大的隕石坑。

由隕石撞擊地球而生成的產物包括玻隕石，是周圍的岩石完全熔融並轉化而成的天然玻璃，令人驚嘆。

Minerals are the fundamental building blocks of rocks, not only here on Earth but also on other planets and asteroids. Some meteorites provide evidence of the early stages of our solar system. Chondrites, for example, are formed by the accumulation of dust and small particles from the early days of the solar system, which gave rise to the 4.56-billion-year-old "primitive" asteroids. Other meteorites are the remnants of asteroids that were large enough to form protoplanets.

These protoplanets underwent fusion, leading to the formation of a differentiated interior, including a silicate-rich crust, a silicate and iron-rich mantle, and an iron-rich core. Some fragments of these different components, namely achondrites, pallasites, and siderites, sometimes reached Earth. The impact created by meteorites striking Earth can be significant, with meteorites breaking, melting surrounding rocks, and creating impressive craters.

Some of the most remarkable features created by such impacts on Earth are tektites. These are formed when surrounding rocks are completely melted and transformed into natural glasses.

展示早期太陽系岩石行星（微行星）碰撞的藝術作品

Artwork showing the collision of rocky bodies (planetesimals) in the early solar system

橄欖隕鐵：「Esquel」隕石
阿根廷丘布特省富塔萊烏富市Esquel礦區
巴黎高科礦業學院礦物學博物館收藏（ENSMP 76760）

PALLASITE: "Esquel" Meteorite
Esquel, Futaleufu, Chubut, Argentina
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 76760)

隕鐵
SIDERITE

坎波德爾謝洛隕鐵（Campo del Cielo）是含大量鐵質的原行星地核的一小部分。估計在大約4,000年前，有一塊隕鐵墜落地球的阿根廷查科省，造成一個3×20公里的巨大隕石坑。自1576年開始，該處開始發現大量隕鐵碎片，而此標本正是其中之一。富鐵的隕鐵石內含微量鎳元素，經過腐蝕後，會在隕鐵表面呈現細微的礦物差異，展現獨特的魏德曼紋格（Widmanstätten patterns）。因其奇異外觀，這種「外星」礦石亦時有用於珠寶創作。

This “Campo del Cielo” siderite is a small part of the iron-rich core of a protoplanet. This fragment is one of many discovered since 1576 in Chaco, Argentina. The meteorite is estimated to have made fallen to Earth about 4,000 years ago, where it created a large impact crater field covering an area of 3 × 20 km. When etched, siderite displays spectacular “Widmanstätten patterns,” which show slight differences in this iron-rich rock, which also contains nickel. Because of its out-of-this world appearance, this kind of alien rock is sometimes used in jewelry.

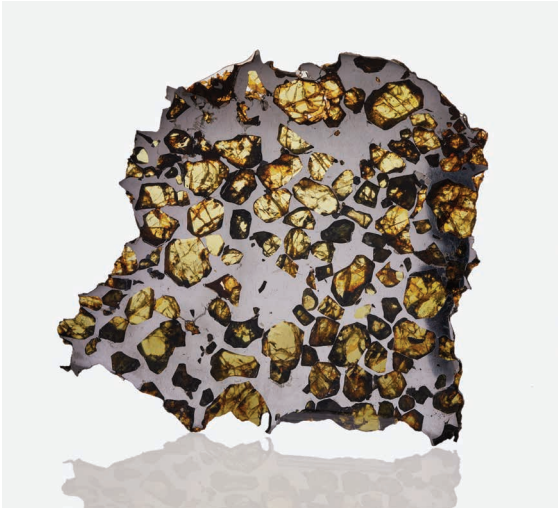
隕鐵：「坎波德爾謝洛」隕石
阿根廷查科省坎波德爾謝洛Tucuman Otumba
巴黎高科礦業學院礦物學博物館收藏（ENSMP 6028）

SIDERITE: “Campo del Cielo” Meteorite
Tucuman Otumba, Campo del Cielo, Chaco, Argentina
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 6028)

橄欖隕鐵
PALLASITE

著名的「Esquel」橄欖隕鐵是一種隕石，呈現了富鐵部分（呈金屬光澤）與富矽酸鹽部分（橄欖石晶體）的融合。當中的橄欖石晶體保留了原有的翠綠色澤，因此被譽為其中一種最美麗的隕石和橄欖隕鐵。這塊隕石的碎片最先在1951年於阿根廷巴塔哥尼亞地區（Patagonian Territory）的丘布特省（Chubut）發現。

The famous “Esquel” pallasite is a meteorite which displays a mix of iron-rich parts (metallic luster) and silicate-rich parts (green olivine crystals). It is considered one of the most aesthetic meteorites and pallasites, due to the olivine crystals having kept their original green color. Fragments of this meteorite were first identified in 1951, in the Chubut Province (Patagonian Territory) in Argentina.



橄欖隕鐵：「Esquel」隕石
阿根廷丘布特省富塔萊烏富市Esquel礦區
巴黎高科礦業學院礦物學博物館收藏（ENSMP 76760）

PALLASITE: "Esquel" Meteorite
Esquel, Futaleufu, Chubut, Argentina
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 76760)

天然玻璃

NATURAL-GLASSES

其中一些最壯麗的「碰撞岩」是天然玻璃，因隕石撞擊地球產生高熱，令附近的岩石熔融而形成。「利比亞沙漠玻璃」就屬於這類碰撞岩，其表面通常帶啞光並呈淡黃色澤。自古埃及時代開始，已有將這種純矽晶玻璃用作寶石。

玻隕石同樣是天然玻璃，由隕石撞擊時拋射到大氣中的岩石碎片形成，這些噴出物形狀獨特，例如這塊在古代中國發現的潑墨狀玻隕石。

最引人注目的玻隕石是捷克的莫爾道玻隕石，通體呈濃厚的墨綠色，並帶有獨特的紋樣。這種天然玻璃亦是珠寶素材之一。

Some of the most spectacular “impactites” are natural glasses, created when a meteorite strikes a terrestrial rock and melts it into glass. “Libyan desert glass” is one of them, with its typical dull luster and yellowish tint. This pure silica glass has been used as a gemstone since Ancient Egypt.

Tektites are also natural glasses, formed from the terrestrial debris ejected during a meteorite impact: these ejecta have distinctive shapes, such as this historic Chinese splash-form tektite.

The most remarkable tektites are moldavites from the Czech Republic, which display remarkable patterns along with an intense bottle green color. These natural glasses are also used in jewelry.

玻隕石：「利比亞沙漠玻璃」
埃及西部沙漠
巴黎高科礦業學院礦物學博物館收藏（ENSMP 6046）

TEKTITE: "Libyan Desert Glass"
Western Desert, Egypt
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 6046)

玻隕石：莫爾道玻隕石
捷克共和國南波希米亞州普拉哈季采轄區萊尼采鎮
巴黎高科礦業學院礦物學博物館收藏（ENSMP 15675）

TEKTITE: Moldavite
Lhenice, Prachatice District, South Bohemian Region, Czech Republic
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 15675)

結語
CONCLUSION

這段探索礦物的旅程以一塊鋰輝石作結，它的化學成分是矽酸鋰，是當今一種炙手可熱的寶石。紫鋰輝石（又稱孔賽石）是鋰輝石的品種之一，因其晶瑩剔透，綻放粉紅晶光，尤受珠寶匠歡迎。然而在美觀以外，鋰輝石也對鋰金屬生產起著關鍵作用。

1817年，化學家約翰·奧古斯特·阿韋德松（Johan August Arfwedson）在瑞典發現鋰元素，並將其命名為「lithium」，取自希臘字彙「lithos」，意指「石頭」。在互聯互通的現代世界中，鋰被廣泛應用於醫藥、運輸、能源和電子產品。南美洲擁有全球最大的鋰藏量，然而澳洲從當地火成岩中的鋰輝石提取鋰，因而成為鋰的第一大生產國，在需求日益殷切的鋰金屬市場佔有重要地位。

對鋰金屬的需求在能源轉型政策下日益飆升，為鋰礦產業的增長和創新提供了重要的機遇。經濟學家預期，全球對鋰金屬的需求在未來十年將大幅增加40倍。鋰礦對於電動車普及化，以至實現可持續運輸可謂不可或缺。

礦物對現代交通和科技進步至關重要。在未來，星際勘探將會繼續在太陽系其他行星和小行星尋找新礦藏，踏上探求寶貴礦物資源的無盡旅途。

鋰輝石：紫鋰輝石
阿富汗努里斯坦Mawi
巴黎高科礦業學院礦物學博物館收藏 (ENSMP 16596)

SPODUMENE: Kunzite
Mawi, Nouristan, Afghanistan
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 16596)

This exhibition's journey through minerals draws to an end with spodumene, a lithium silicate that is highly sought after today. Its pink, transparent gem variety known as kunzite is popular with jewelers. However, in addition to its aesthetic appeal, spodumene is also crucial for lithium production.

Discovered by Johan August Arfwedson in 1817 in Sweden, lithium has proven to be a vital material for our interconnected world. Derived from the Greek *lithos,* meaning stone, lithium is widely utilized in medicine, transportation, energy, and electronics. While South America boasts the largest lithium reserves, Australia stands out as the leading producer of lithium found in spodumene within magmatic rocks. This underscores Australia's important role in meeting the escalating global demand for lithium.

This increasing surge in demand for lithium, driven by energy transition policies, presents significant opportunities for growth and innovation in the industry. Economists predict a substantial rise in lithium demand, with estimates indicating a 40-fold increase in the next decade. Without lithium ores, the development and widespread adoption of electric vehicles, a key component of sustainable transportation, would not have been achievable.

Minerals play an indispensable role in modern travel and technological advancements. In the future, interplanetary expeditions will likely seek out new deposits on planets and asteroids in our solar system, in an endless quest for treasured mineral resources.

鋰礦石
SPODUMENE: Kunzite

這塊不同凡響的巨大平板形礦石名為鋰輝石，屬單斜晶系，形狀近乎完美。

此鋰輝石展品色澤呈粉紅至淡紫，此類鋰輝石被稱為紫鋰輝石。紫鋰輝石常被用於珠寶創作，因而在珠寶匠之間聲名大噪。1902年，Tiffany & Co. 其時的首席珠寶匠兼著名礦物學家喬治·弗雷德里克·昆茨（George Frederick Kunz）（1856-1932），首先發現並詳細記述紫鋰輝石，故紫鋰輝石得英文名「kunzite」。

鋰輝石的化學成分是矽酸鋰，是現今世上最主要的鋰礦石之一。

This impressive flat mineral is called spodumene. It displays an almost perfect shape, belonging to the monoclinic crystal system.

When a spodumene is pink or light purple in color, such as the one shown in the display, it is referred as kunzite. This variety is well known to expert jewelers thanks to its applications in jewelry. It was named after George Frederick Kunz (1856–1932), Tiffany & Co.'s chief jeweler and a renowned mineralogist, who first described kunzite in 1902.

Spodumene is a lithium and aluminum silicate and one of the main lithium ores.

鋰輝石：紫鋰輝石
阿富汗努里斯坦Mawi
巴黎高科礦業學院礦物學博物館收藏（ENSMP 16596）

SPODUMENE: Kunzite
Mawi, Nouristan, Afghanistan
Collection of the Mineralogy Museum of Mines Paris – PSL (ENSMP 16596)

關於

巴黎高科礦業學院礦物學博物館

ABOUT

THE MINERALOGY MUSEUM OF *MINES PARIS - PSL*

巴黎礦物學博物館和巴黎高科礦業學院的歷史密不可分。1783年3月19日，國王路易十六向國務委員會頒布諭令創辦學院。1794年7月1日，勒內-朱斯特·阿維（René-Just Haüy）依令出任第一任館長，學院的礦物學陳列室正式轉型為博物館。根據規定，博物館的目標是「收藏地球上及法蘭西共和國所有礦物物產，並按地點順序排列。」有賴Sage、Werner、Brongniart、Berthier、Dufrénoy、Daubrée、Mallard等著名地質學家、許多偉大科學家及低調的業餘收藏家購入、捐贈和搜羅礦物，館藏日益豐富。

The history of the Mineralogy Museum of Mines Paris - PSL is closely linked to that of the École des Mines. It began on March 19, 1783, with a decree from King Louis XVI's Council of State. The Mineralogy Cabinet was transformed into a veritable collection when René-Just Haüy was appointed its first curator by decree on July 1, 1794. It was stipulated that it should "contain all the productions of the globe and all the productions of the Republic, arranged in order of locality". Over time, the collection was enriched by purchases, donations and harvests from famous geologists such as Sage, Werner, Brongniart, Berthier, Dufrénoy, Daubrée, Mallard and many other great scientists and modest amateur collectors.

在Hôtel Vendôme展示地球的奇蹟

1815年8月，國立巴黎高等礦業學院遷至Hôtel Vendôme。直至十九世紀中葉，這些藏品才得以整理分類，並放入匈牙利橡木櫃和展示櫃。相連的展廳和家具均以原始佈局（1850至1856年）保存下來。

世界上最優秀的礦物收藏之一

博物館的藏品是世界上最豐富的系統化收藏之一，收藏十萬件樣本，並展出其中5,000件，當中涵蓋逾千種不同礦物。訪客將可探索這些薈萃超過200年研究成果的樣本，透過採樣盤點地球以至宇宙的礦物多樣性。這座歷史悠久的博物館享譽全球，除了礦物外，亦向公眾展出寶石、岩石、隕石及少量人工合成礦石。

A showcase for the Earth's wonders in the heart of the Hôtel Vendôme.

The École des Mines moved into the Hôtel Vendôme in August 1815. It was not until the mid-19th century that the collection was arranged and displayed in Hungarian oak cabinets and display cases. This collection of enfilade rooms and furniture has been preserved in its original configuration (1850 to 1856).

One of the world's finest mineral collections.

The museum boasts one of the world's largest systematic collections, with 100,000 samples in the collection and 5,000 on display, including over a thousand species on show. Visitors will discover samples that are the fruit of over 200 years of research, sampling and inventorying the mineralogical diversity of the Earth and the Universe. Not only minerals, but also gems, rocks, meteorites and a few artificial crystals are presented to the public in this historic, internationally renowned museum.

礦物資源及新物料

博物館不僅保育物種和展示礦物世界之美，同時致力研究。近年，對礦物元素的工業用途發現日多，新技術亦仰賴稀土和稀有元素，例如用於製造手機的鉭和鍺、航空航天業的太陽能光電板及特製精鋼。因此，我們有必要重新審視正在或已經開發的所有礦藏，以了解礦產在新用途方面的潛力和豐富程度。礦物收藏因此成為名副其實的資料庫，供研究人員分析，以制定獲取和使用礦物資源的策略，將我們帶回藏品在革命時期所扮演的角色。

Mineral resources and new materials

This museum is not just a conservatory of species and a showcase for the beauty of the mineral world; it is also a place for research. In recent years, more and more industrial uses have been discovered for the elements contained in minerals. New technologies call on rare earths and elements. For example, tantalum and germanium are used to manufacture cell phones, photovoltaic panels and special steels for the aerospace industry. It is therefore necessary to revisit all the deposits that are being or have been exploited, in order to understand their potential and richness with regard to these new uses. Mineral collections thus become veritable data banks, which researchers analyze to define strategies for acquiring and exploiting mineral resources. This brings us back to the role of collections ascribed to them during the revolutionary period.

© Kevin Mak, courtesy of Sou Fujimoto Architects

關於

L'ÉCOLE 珠寶藝術學院 亞太區分校

ABOUT

L'ÉCOLE ASIA PACIFIC, *SCHOOL OF JEWELRY ARTS*

歡迎蒞臨L'ÉCOLE 珠寶藝術學院亞太區分校

蒙高级珠寶世家 Van Cleef & Arpels 梵克雅寶鼎力支持，L'ÉCOLE 珠寶藝術學院於2012年創立，旨在向公眾全方位傳播珠寶文化。

L'ÉCOLE珠寶藝術學院為一所入門學校，它不設任何先修課程門檻，歡迎所有人參與，包括完全初學者，以至具一定知識的業餘人士、收藏家以及對珠寶世界的好奇者。自創立以來，L'ÉCOLE珠寶藝術學院經已迎來超過七萬名學生，他們年齡從18到83歲，來自逾四十個國家。

學院的課程涵蓋三大範聯，分別是珠寶製作的珠寶藝術歷史、寶石世界和珠寶精湛工藝。

學院每月提供課程，由一群熱心的導師、珠寶藝術史學家、寶石學家、珠寶匠及珠寶製作相關的藝術家教授。每課為時二至四小時，每次由兩位專業老師指導六到十二名學員，旨在透過親切的學習氣氛，促進交流與分享，締造最理想的學習環境。課程為每位學生量身定制，每個人都可以根據自己的興趣和動機，自由選擇一門或多門課程。

課程以實踐為基礎。學員可在專業老師指導下學習技能和工具的使用。珠寶藝術史課堂為學員帶來鑑賞L'ÉCOLE珠寶藝術學院傳世古董珠寶珍藏的特別待遇。在寶石課程中，學員可利用寶石學家的專業器材，觀察不同種類的寶石。

學院亦提供其他活動：每月免費的網上對談、刊物及展覽，並為兒童及青少年設立六個創意工作坊。

Welcome to L'ÉCOLE Asia Pacific, School of Jewelry Arts

Established in 2012 with the support of Van Cleef & Arpels, L'ÉCOLE, School of Jewelry Arts aims to introduce the public to all aspects of jewelry culture.

It is an initiation school, open to everyone, with no special prerequisites. L'ÉCOLE targets complete beginners as well as enlightened amateurs, collectors and those with a curiosity for the world of jewelry. Since its creation, L'ÉCOLE has already welcomed more than seventy thousand students, from some forty countries, aged from 18 to 83 years old.

L'ÉCOLE offers courses in three major fields: the history of jewelry, the world of gemstones and the *savoir-faire* of jewelry-making techniques.

Courses are taught every month by a group of passionate teachers, art historians, gemologists, jewelers and artisans. Classes last from two to four hours and are taught by two teachers with between six and twelve students per group, in an effort to provide optimal learning conditions. The aim is to foster conviviality, exchange and sharing. The program is tailored to each student and everyone is free to choose one or more courses, based on their interests and motivation.

The classes are practice-based. The students experiment with gestures, skills and tools, guided by their teachers. In art history, they have the privilege of admiring antique jewelry from L'ÉCOLE collections and in the gemology classes, they can observe the different stones using the instruments of the gemologist.

L'ÉCOLE also offers other activities: free and monthly live online conversations, book publishing, exhibitions. Six creative workshops were created for children and teenagers.

L'ÉCOLE 珠寶藝術學院全球設有五間分校：

除巴黎兩處校址外，L'ÉCOLE珠寶藝術學院在香港、上海和杜拜各有一間分校。歷史悠久的巴黎校舍坐落私人宅邸Hôtel de Ségur，由建築師Jacques V Gabriel 於十八世紀初設計建造，毗鄰歷史古蹟芳登廣場——過百年來匯聚頂級法國珠寶品牌的殿堂。第二間巴黎校舍選址 Hôtel de Mercy-Argenteau，是林蔭大道上少數保存至今的十八世紀建築。

第二間分校於2019年秋季登陸香港西九龍，坐落香港藝術設計的核心地段。校舍由日本建築師藤本壯介設計，營造開揚明亮的空間。

2023年秋季，L'ÉCOLE珠寶藝術學院進一步拓展亞洲和中東版圖，開設兩所新分校。上海分校選址新古典主義風格的歷峰雙子別墅，這幢文化地標屹立於享有「東方香榭里舍大道」美譽的淮海路；另一間分校進駐杜拜D3設計區，融入這個文藝氣息濃厚、深受當代藝術愛好者喜愛的國度。

此外，L'ÉCOLE珠寶藝術學院自成立以來，定期走訪世界各地，在歐洲、美國、亞洲和中東舉辦講座、展覽或為期一至三週的巡迴課程，致力於在國際層面弘揚珠寶文化。

L'ÉCOLE now has five locations around the world:

Two in Paris, one in Hong Kong, one in Shanghai and one in Dubai. In Paris, L'ÉCOLE's historic campus is located in a private mansion called the Hôtel de Ségur, built at the beginning of the early 18th century by architect Jacques V Gabriel. It is a stone's throw from the Place Vendôme, the historical heart of the French jewelry universe for over a century. Its second Parisian home is located in the Hôtel de Mercy-Argenteau, one of the few 18th century buildings preserved on the Grands Boulevards.

A second school opened in the fall of 2019 in Hong Kong, in Western Kowloon, right in the heart of the design district, in an airy, light-filled space designed by Japanese architect Sou Fujimoto.

In the fall of 2023, L'ÉCOLE extended its presence in Asia and in the Middle East with the opening of two new campuses. In Shanghai, L'ÉCOLE chose the Twin Villas as its home, a neoclassical building that is a symbolic landmark in the historic Huaihai Road neighborhood – also well-known as the "Oriental Avenue des Champs-Élysées". In Dubai, place of cultural effervescence and a popular destination for contemporary art lovers, L'ÉCOLE opened its doors in D3 Design District.

Moreover, since its inception, L'ÉCOLE regularly travels abroad, in Europe, America, Asia and the Middle East, for talks, exhibitions or travelling course programs that can last one to three weeks. L'ÉCOLE, School of Jewelry Arts therefore contributes to the promotion and visibility of jewelry culture on an international scale.

© Kevin Mak, courtesy of Sou Fujimoto Architects

深入珠寶世界

如果希望延續你的礦物之旅，歡迎前來 L'ÉCOLE 珠寶藝術學院，更深入探索迷人的寶石世界。

L'ÉCOLE 珠寶藝術學院的課程揉合地質學、寶石學和專業知識，你將了解寶石在地幔中形成的驚人過程，並學習處理和分辨寶石的方法。

To go further

To pursue your journey in the heart of minerals, come and learn about the fascinating world of gemstones at L'ÉCOLE, School of Jewelry Arts.

The courses of L'ÉCOLE, which combine geology, gemology and know-how will make you understand the stupefying creation process of gemstones at the center of the Earth and teach you how to handle and recognize them.

探索寶石的世界

探索寶石學

晶體在何處及如何形成？寶石有哪些不同種類？

在本課程，您可探索寶石的形成過程、豐富多樣的寶石種類，以及開採及收集寶石的不同方式。學習寶石切割的發展、目標及不同階段，以及評估寶石的技巧。

最後，為了讓學員更深入了解課程的主題，導師會帶領學員進行三項實驗，使用寶石學家的工具研究和觀察寶石。

DISCOVER THE GEMSTONES

Become initiated into Gemology

Where and how do crystals form? What are the different varieties of gems?

During this course, you will discover the origin of gemstones, their great variety and the different techniques used to extract and collect them. You will then learn about the development, goals and the various stages in cutting and polishing, as well as the evaluating techniques for gemstones.

Finally, to concretize what you have been learning, your teachers will guide you through three hands-on experiences, during which you will manipulate and observe the stones using gemologists' tools.

探索寶石學

人數：12名
時數：4 小時
導師：2位寶石學家
語言：英語、粵語
費用：每位港幣2,000元

Practical Information

Number of participants: 12 maximum
Duration: 4 hours
Teachers: 2 gemologists
Language: English or Cantonese
Price: HK$ 2,000 / person

鑑別寶石

探索寶石學及辨別珍貴寶石

透過訓練觀察技巧及了解寶石學家的工具，成為精通寶石學的寶石收藏家。

投入非凡珍貴寶石市場色彩繽紛的世界，包括泰國莊他武里、斯里蘭卡拉特納普勒及哥倫比亞波哥大，學習如何分辨不同寶石的差異。先用肉眼觀察寶石，然後如專家一樣使用專業工具，包括放大鏡、折射儀、偏光儀及天秤。

RECOGNIZE THE GEMSTONES

Familiarize yourself with gemology and how to identify the gemstones

Like a specialist, become comfortable with the gemologists' tools and train your eye in order to become a connoisseur.

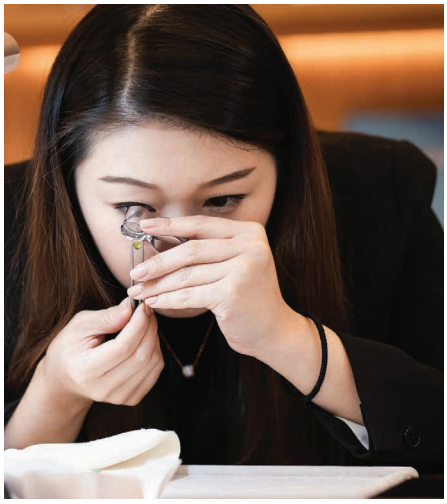
During this course, let yourself get transported into the ambiance of the great precious stone markets—Chanthaburi in Thailand, Ratnapura in Sri Lanka or Bogota in Colombia. You will learn to distinguish a group of different gemstones, which can seem very similar to the uninitiated. You will also observe stones with your naked eye and then with the professionals' instruments: hydrostatic scale, refractometer, polariscope, and specific gemologists' scale.

實用資訊

人數：12名
時數：4 小時
導師：2位寶石學家
語言：英語、粵語
費用：每位港幣2,000元

Practical Information

Number of participants: 12 persons maximum
Duration: 4 hours
Teachers: 2 gemologists
Language: English or Cantonese
Price: HK$ 2,000 / person



鳴謝 ACKNOWLEDGMENTS

L'ÉCOLE珠寶藝術學院謹向各界好友、借出藏品的單位、合作單位及展覽訪客致以衷心謝意。

L'ÉCOLE, School of Jewelry Arts particularly wishes to thank and express its deepest gratitude to the lenders, contributors, friends, partners, and visitors of this exhibition.

藏品借展
THE LENDERS

巴黎高科礦業學院
礦物學博物館
Mineralogy Museum of
Mines Paris - PSL

Faerber Collection
Hong Kong

Palais Royal Hong Kong Ltd

Samuel Kung Company Ltd

及其他私人收藏家
And other Private Collectors

策展人
THE CURATORS

Eloïse Gaillou
巴黎高科礦業學院礦物學博物館
總監及策展人
Director of the Mineralogy
Museum of Mines Paris - PSL

Didier Nectoux
地質學家及巴黎高科礦業學院
礦物學博物館前總監
Geologist and former Director
of the Mineralogy Museum of
Mines Paris - PSL

梵克雅寶（國際）
VAN CLEEF & ARPELS INTERNATIONAL

Nicolas Bos
全球總裁及首席執行官
President & CEO of
Van Cleef & Arpels

梵克雅寶（亞太區）
VAN CLEEF & ARPELS ASIA PACIFIC

Julie Clody Medina
亞太區總裁
President Asia Pacific

歷峰集團（亞太區）
RICHEMONT ASIA PACIFIC

Sylvia Nam
Chief Financial Officer,
Richemont Asia Pacific

Jenko King, Billy Yu, Billy Ng,
Zabina Wong, Damon Ho,
Carrie Shiu, Dick Lam

歷峰集團（瑞士）
RICHEMONT SWITZERLAND

Pierre-Yves Perrin,
Sophie Chiaradia,
Milena Ferro-Luzzi,
Melina Haralabopoulos,
Arlene Marce

L'ÉCOLE 珠寶藝術學院
L'ÉCOLE, SCHOOL OF JEWELRY ARTS

Lise Macdonald
L'ÉCOLE 珠寶藝術學院院長
President, L'ÉCOLE,
School of Jewelry Arts

Olivier Segura
L'ÉCOLE珠寶藝術學院
亞太區董事總經理
Managing Director,
L'ÉCOLE Asia Pacific

Guillaume Glorieux
L'ÉCOLE 珠寶藝術學院
教育及研究總監
Director of Education and
Research, L'ÉCOLE,
School of Jewelry Arts

展覽策劃及製作
EXHIBITION DEVELOPMENT & PRODUCTION

Ann Lee, Marius Lubin,
Brenda Lui, Mathilde Rondouin,
Stephanie Wong

Emmanuelle Amiot, Anne-Laure Battistelli, Evgeniya Berlova, Katia Cartacheff, Jacko Chan, Jing Jing Chen, Louis Cheung, Cherry Chiang, Mathilde Ecoffey, Frédéric Gilbert-Zinck, Yulia Ho, Kaitlyn Ip, Jennifer Kong, Fiona Law, Alice Leung, Léonard Pouy, Clara Ribeiro, Daphna Rozenkier, Julien Sekkiou, Ginevra Tonelli, Cherry Wong, Fu Wong, Charlene Xie, the faculty members, and all those who have helped in carrying out this beautiful project.

PETER CHEUNG ASIA LTD.
Peter Cheung,
Cindy Poon

K11 MUSEA
鄭志剛先生及團隊
Mr. Adrian Cheng and
his teams

展覽視覺及目錄設計
GRAPHIC IDENTITY & CATALOG DESIGN

Bureau 142
Milkxhake

語音導賞
AUDIOGUIDE

Drum Studio

佈展
SCENOGRAPHY

Concepts Team
Van Cleef & Arpels

製作團隊
PRODUCTION

Aïnu
MaxiSouk
Winco Design Limited

攝影
PHOTOGRAPHY

除另外註明外，所有相片由
Benjamin Chelly拍攝
All photos are taken by
Benjamin Chelly unless
stated otherwise

影像製作
VIDEOGRAPHY

Beaux Arts Magazine
Laurent Kariv
Rewind Films

翻譯及校對
TRANSLATION & PROOFREADING

Metis Concepts
Dorothy Cheung

於香港印行
Printed in Hong Kong by
Add Creative Ltd

本叢書由L'ÉCOLE 珠寶藝術學院亞太區分校出版
This catalog has been published in 2024 by L'ÉCOLE Asia Pacific

由梵克雅寶支持創立 L'ÉCOLE 珠寶藝術學院呈獻
L'ÉCOLE Asia Pacific, School of Jewelry Arts
Supported by Van Cleef & Arpels Presents

礦石奇珍
Journey with Minerals

展覽 Exhibition
20.07.2024 – 31.10.2024

Journey with Minerals
礦石奇珍

訂閱我們的電子通訊!
Subscribe to our newsletter!

www.lecolevancleefarpels.com/hk/#newsletter

L'ÉCOLE 珠寶藝術學院亞太區分校
L'ÉCOLE Asia Pacific, School of Jewelry Arts

香港九龍尖沙咀梳士巴利道 18 號 K11 MUSEA 五樓 510A
510A, 5F, K11 MUSEA, 18 Salisbury Road,
Tsim Sha Tsui, Hong Kong

免費入場 Free Admission
每天下午 1PM - 7 PM Daily

設有粵語、英語及普通話導賞團
Guided tours are available in
Cantonese, English and Mandarin

L'ÉCOLE 珠寶藝術學院亞太區分校歡迎大家探索
珠寶的神秘世界,領略箇中奧妙。

L'ÉCOLE Asia Pacific, School of Jewelry Arts
welcomes everyone to
Discover, Wonder, Learn
about the secret world of jewelry.

ISBN 978-988-76973-3-6

#JourneyWithMinerals
@LECOLEAsiaPacific
lecolevancleefarpels.com/hk