SYSTEMATIC MINERAL COLLECTION

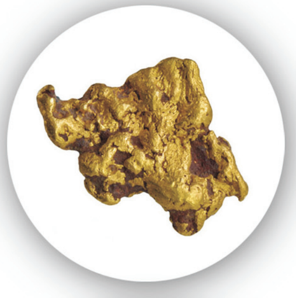
ENGLISH

INFORMATION SHEET 3 (CASES 1-19)

Mineral classification is based on the chemical composition and internal structure of the crystals, since both characteristics determine the essence and physical properties of each mineral. This information sheet describes the most representative and well-known minerals from each category. The collection contains more than 2,000 specimens from Spain and abroad.

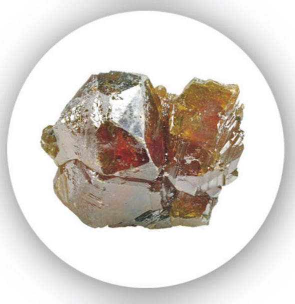
CASE 1
NATIVE ELEMENTS

Gold (Au). Sil River (Spain). Gold is a noble metal that does not combine with oxygen and therefore does not oxidise over time. It forms networks of threads or sheets, branched, tree-like structures and even crystals with visible faces. Gold is very soft (2.5-3 on the Mohs scale) and malleable. Maximum dimension: 4.5 cm.



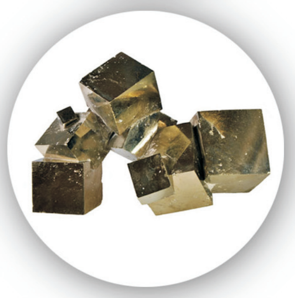
CASE 2
SULPHIDES AND SULPHOSALTS

Sphalerite (ZnS). Áliva, Cantabria (Spain). Sphalerite is the main ore for zinc. When the crystals are transparent with a light brown, reddish or greenish colour, the mineral is referred to in Spain as being “caramelised”. Although the mineral is soft (3.5-4 on the Mohs scale), it is very beautiful and can be used to cut spectacular gems. Maximum dimension: 7 cm.



CASE 3
SULPHIDES AND SULPHOSALTS

Pyrite (FeS_2). Navajún, La Rioja (Spain). Pyrite is one of the most abundant sulphide minerals in nature. This mineral crystallises in the cubic crystal system and its typically yellow hue and metallic lustre have often led it to be confused for gold, hence its nickname, “fool's gold”. However, its hardness (6-6.5 on the Mohs scale) easily distinguishes it from gold. Maximum dimension: 20 cm.



CASE 5
HALIDES

Halite (NaCl). Alcanadre, La Rioja (Spain). Halite is common salt. When crystallised, it can form excellent cubic specimens. Halite is a soft, light mineral whose main characteristic is its high solubility in water. Although generally white, some specimens may be blue or yellow due to impurities. Maximum dimension: 22 cm.

CASE 6
OXIDES AND HYDROXIDES

Haematite (Fe_2O_3). Rankua, Guandung (China). Haematite crystallises in the trigonal crystal system. This mineral is usually massive (without visible crystalline forms), but it sometimes forms “rosettes” of tabular crystals. It is hard and has a metallic lustre. Its typically black colour contrasts with the deep red, blood-like colour of the mineral when ground. Maximum dimension: 13 cm.

CASE 8
NITRATES, BORATES AND CARBONATES

Calcite ($CaCO_3$). Dima, Vizcaya (Spain). Calcite is the most stable polymorph of calcium carbonate and is thus very abundant. More than 300 different morphologies have been described, but one of the most common is a rhombohedral habit due to cleavage. Transparent, colourless calcite crystals are birefringent, meaning that they split incident light into two rays taking slightly different paths (double refraction). Maximum dimension: 13 cm.

CASE 11
SULPHATES, CHROMATES, MOLYBDATES AND TUNGSTATES

Gypsum ($CaSO_4 \cdot 2H_2O$). Pisco, Ica (Peru). Gypsum crystallises in the monoclinic system, resulting in very varied forms: tabular, prismatic, acicular, in “rosettes”, etc. The crystals often show a range of different colours, including colourless, white, grey, yellowish, reddish and even black. It is a very soft mineral (2 on the Mohs scale), and is mainly used in building construction. Maximum dimension: 15 cm.

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CASE 12 PHOSPHATES, ARSENATES AND VANADATES

Apatite [$Ca_5(Po_4)_3(F,Cl,OH)$]. Cerro del Mercado, Durango (Mexico). Apatite is the most representative mineral within this category. Actually, it consists of a group of species distinguished by their concentrations of fluorine, chlorine or OH groups. Its colour varies between shades of brown, green, blue and even violet. Maximum dimension: 5 cm.

CASE 14 NEOSILICATES AND SOROSILICATES (isolated and paired structures)

Grossular [$Ca_3Al_2(SiO_4)_3$]. Nesosilicate. Asbestos, Quebec (Canada). This mineral is forms part of the garnet group. All of them are dense and hard with a glassy lustre. Grossular may present brown hues but is more commonly cream coloured. When the crystals are transparent, they can be cut and used for jewellery. Maximum dimension: 12 cm.

CASE 15 CYCLOSILICATES (ring structures)

Beryl (aquamarine) ($Be_3Al_2Si_6O_{18}$). Pereña, Salamanca (Spain). When beryl crystals are transparent and coloured, they can be cut to produce highly appreciated gems. The most well-known of these are emerald (green) and aquamarine (blue). This is possible thanks to the extreme hardness of this mineral (7.5-8 on the Mohs scale). Maximum dimension: 7 cm (faceted gemstone: 2.5 cm).

CASE 16 INOSILICATES (chain structures)

Aegirine ($NaFeSi_2O_6$). Zomba Plateau (Malawi). Aegirine belongs to the pyroxene group of minerals, meaning that the inosilicates are composed of simple chains. It crystallises in the monoclinic system, giving rise to beautiful elongated, prismatic crystals. Colours vary between dark grey and black with a glassy lustre, and the mineral is of intermediate hardness (6 on the Mohs scale). Maximum dimension: 8 cm.

CASE 17 PHYLLOSILICATES (sheet structures)

Muscovite [$KAl_2(Si_3Al)O_{10}(OH_2)$]. Ferros, Minas Gerais (Brazil). Muscovite evidences the internal structure of this systematic subclass, as it forms hexagonal crystals consisting of sheets that can easily be separated by hand. It is usually silvery white, although the colour may vary due to impurities. This mineral has excellent thermal insulation properties. Maximum dimension: 8 cm.

CASE 18 TECTOSILICATES (framework structures)

Orthoclase ($KAlSi_3O_8$). Tessino (Switzerland). One of the main groups within the tectosilicates is that of the feldspars, the most abundant minerals on the Earth's crust. Orthoclase is the most common potassium feldspar. Although it is usually white, cream or pink, this specimen is green because it is partially coated with small chlorite crystals. Maximum dimension: 10 cm.

CASE 19 TECTOSILICATES (framework structures). Varieties of silica.

Quartz (agate) (SiO_2). Uruguay. Agate is composed of different-hued bands of small quartz crystals, usually presenting a fibrous habit (chalcedony). It forms as the result of sequential deposition in geodes or cavities in volcanic rocks. Quartz is extremely abundant in nature, and more than 20 different varieties have been described. Maximum dimension: 16 cm.