* Summarise the significance of silver through history

coin metal

- associated with moon

- 3000BC egype

- Old World Silver (4000BC - 1500AD) - decorative and functional use

- New World Silver (1500 - 1875) - late 1490s, in Mexico

- Rise of NA (1876 - 1920) - Nevada, mid 1800s,  (Colorado, Utah, Idaho, BC) would quickly follow suit

- Modern (1921 - now) - lower grades before are now profitable

* Describe the diagnostic properties of silver

native form like gold

- 10.5 density, 107.5 amu

- The melting point of silver is 961 °C; it boils at approximately 2212 °C.

- high thermal and electrical conductivity

- can tarnish

- not noble metal, but precious metal

* Describe the basic structure and habit of crystalline silver

- contains bit of gold and sometimes mercury, arsenic, and antimony.

When silver is alloyed with gold, the intermediate mineral is commonly known as electrum.

- isometric

-commonly occurs as wiry or dendritic crystals with a metallic lustre

- low hardness (2.5) when pure

- untarnished are bright white

- Tetrathedrite and freibergite, solid solution series, isometric

- They are described as sulfosalts, with a base formula of (Ag,Cu,Fe, Zn)12(Sb,As,Te)4S13

- Freibergite is the most Ag-rich variety and tetrahedrite is commonly applied to minerals of the series that do not have chemical analyses.

- also referred to as  fahlore

- Argentite and acanthite are the high and low temperature forms of Ag2S. Above ~170 °C the isometric crystal structure of argentite is most stable, and below 170 °C Ag2S exists with the monoclinic crystal structure of acanthite

- case of Polymorphism (poly=many, morph=shape or form) describes the occurrence of two or more distinct minerals that have the same chemical composition but different crystal structures. Like Diamond and graphite

- Pseudomorphism is the existence of one mineral in the shape of another, resulting in a similar appearance but different internal structure.

- Polybasite is described as (Ag, Cu)16Sb2S12

* Compare the properties of silver to other metals we studied
* List the major silver ore minerals

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* Describe the common geological settings in which silver ores occur

- Greece and Mexico, native silver released from sulfide phases by weathering and oxidation

* Describe the two general periods of silver mining in Canada

- initially, thin veins of high quality

- another method now is by-product of polymetallic deposits (VMS, or Volcanogenic Massive Sulfide (VMS) deposits). Essentially, lower grade

* Define the terms vein, ore and gangue

- Veins are infillings of fractures by minerals. Two components: ore and gangue

-  ore includes the metal bearing minerals of economic interest

-  gangue includes minerals of no economic interest

- tabular- or sheet-like with a small width but quite extensive in two directions.

- gangue minerals of veins usually consist of quartz, calcite, and some minor sulfides such as pyrite

- usually thin (10cm), sometimes few meters

-

* Describe important silver districts of Canada

- Ontario - Cobalt Ag - 4.7 billion (today prices)

- over 11000 ton

- Elsa, Yukon - 1.37kg per ton

- discovered with Klondike gold rush

-2.4 billion with zinc and pb

- under 7000t

Also includes Slocan District of the BC Kootenays and the Coeur d'Alene district of Idaho

* Describe the formation, major elements found within, and size range of volcanogenic massive sulphide deposits

- VMS deposits are also known as volcanic-associated, volcanic-hosted, and volcano-sedimentary-hosted massive sulphide deposits

- VMS deposits form at or near the seafloor through the focused discharge of hot, metal-rich hydrothermal fluids.

- 150 million tonnes

- Spain’s portion of the Iberian Pyrite Belt (IPB), with contained ore in excess of 1.535 billion tonnes

- The richest supergiant deposit produced to date is Neves Corvo on the Portuguese side of the IPB, with ore in excess of 270 Mt, with 8.8 Mt of contained metal.

- Mostly in New Brunswick and Quebec of Canada (then ontario)

- Though low grade, sheer size means lots of silvers

* Describe the modern and historical uses of silver

- coinage, jewellery, and functional art.

- circuits, contacts, conductors, fuses, and within capacitors

- radio frequency identification devices (RFID), which are becoming common on passports and driver’s licenses

- reflective coating, batteries

- silverware, lyre,

- Sterling silver, defined as 92.5% pure silver, standardized in 13th century

- Photography - The silver halide produces native silver, amounts depending on amount of light or exposure