

Minerals of interest in Asian Painting
 Compiled by John C. Huntington

<p>Aragonite (Whiting) Mineral form</p>		<p>Aragonite is a carbonate mineral, one of the two common, naturally occurring polymorphs of calcium carbonate, CaCO₃.</p>
<p>Aragonite (Whiting)</p>		
<p>Azurite Mineral form</p>		<p>Azurite is a soft, deep blue copper mineral produced by weathering of copper ore deposits. crystals are monoclinic, and when large enough to be seen they appear as dark blue prismatic crystals. Azurite specimens are typically massive to nodular, and are often stalactitic in form. Specimens tend to lighten in color over time due to weathering of the specimen surface into malachite. Azurite is soft, with a Mohs hardness of only 3.5 to 4. The specific gravity of azurite is 3.77 to 3.89. Azurite is destroyed by heat, losing carbon dioxide and water to form black, powdery copper(II) oxide.</p>
<p>Azurite Mineral form Chinese specimen</p>		

Azurite		
Calcium Carbonate	<p>Aragonite Calcite Vaterite or ($\mu\text{-CaCO}_3$) Chalk (Blackboard chalk is calcium sulfate, CaSO_4) Limestone Marble Travertine</p>	<p>Calcium carbonate is a chemical compound with the chemical formula CaCO_3. It is a common substance found as rock in all parts of the world, and is the main component of shells of marine organisms, snails, and eggshells. Calcium carbonate is the active ingredient in agricultural lime, and is usually the principal cause of hard water</p>
Cerussite Mineral form		<p>The mineral is usually colorless or white, sometimes grey or greenish in tint and varies from translucent to transparent with an adamantine lustre. It is very brittle, and has a conchoidal fracture. It has a Mohs hardness of 3 to 3.75 and a specific gravity of 6.5.</p>
Cerussite (White Lead)		
Cinnabar Mineral form		<p>Cinnabar, sometimes written cinnabarite, is a name applied to red mercury(II) sulfide (HgS), or native vermilion, the common ore of mercury.</p>

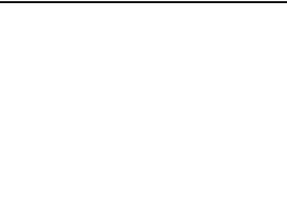
Cinnabar (Natural Vermillion)		
Coral Red Animal		<p>Precious coral or red coral is the common name given to <i>Corallium rubrum</i> and several related species of marine coral. The distinguishing characteristic of precious corals is their durable and intensely colored red or pink skeleton, which is used for making jewelry.</p>
Coral Red		<p>Mostly used as gems and “treasure” in Chinese and Tibetan art</p>
Cuprite		<p>Cuprite is a mineral composed of copper(I) oxide Cu_2O, and is a minor ore of copper. Its dark crystals with red internal reflections are in the isometric system hexoctahedral class, appearing as cubic, octahedral, or dodecahedral forms, or in combinations. Penetration twins frequently occur. In spite of its nice color it is rarely used for jewelry because of its low Mohs hardness of 3.5 to 4. It has a relatively high specific gravity of 6.1,</p>

<p>Dioptase Mineral form</p>		<p>Dioptase is an intense emerald-green to bluish-green copper cyclosilicate mineral. It is transparent to translucent. Its luster is vitreous to sub-adamantine. Its formula is $\text{CuSiO}_3 \cdot \text{H}_2\text{O}$ (also reported as $\text{CuSiO}_2(\text{OH})_2$). It has a hardness of 5, the same as tooth enamel. Its specific gravity is 3.28–3.35,</p>
<p>Dioptase</p>		
<p>Glaucosite</p>		<p>Glaucosite is a phyllosilicate (mica group) mineral. It can also be referred to as an iron silicate. It crystallizes with monoclinic geometry. The name is derived from the Greek <i>glaucos</i> ($\gamma\lambda\alpha\upsilon\kappa\omicron\varsigma$) meaning 'gleaming' or 'silvery', to describe the appearance of the blue-green color. Its color ranges from olive green, black green to bluish green. It is probably the result of the iron content of the mineral. In the Mohs scale it has hardness of 2. The relative specific gravity range is 2.4 - 2.95. It is normally found in dark green rounded nodules of sand size dimension.</p>

<p>Glauconite (Green Earth)</p>		
<p>Gold Mineral form</p>		<p>Gold (pronounced / ' goʊld/) is a chemical element with the symbol Au (from its Latin name <i>aurum</i>) and atomic number 79.</p>
<p>Gold pigment</p>		<p>Used in both painting and sculpture in Asia</p>
<p>Hematite Mineral form</p>		<p>Hematite, also spelt hæmatite, is the mineral form of Iron(III) oxide (Fe_2O_3), one of several iron oxides. Hematite crystallizes in the rhombohedral system, and it has the same crystal structure as ilmenite and as corundum.</p>
<p>Hematite</p>		
<p>Jarosite Mineral form</p>		<p>Jarosite is a basic hydrous sulfate of potassium and iron with a chemical formula of $\text{KFe}^{(\text{III})}_3(\text{OH})_6(\text{SO}_4)_2$. This mineral is formed in ore deposits by the oxidation of iron sulfides.</p>

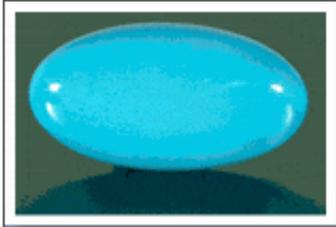
Jarosite		
Carbon black Ivory black Lamp Black Vine black	 	<p>Carbon black (Colour Index International, PBL-7) is the name of a common black pigment, traditionally produced from charring organic materials such as wood or bone. It consists of pure elemental carbon, and it appears black because it emits almost no light in the visible part of the spectrum. It is known by a variety of names, each of which reflects a traditional method for producing carbon black:</p> <p>Ivory black was traditionally produced by charring ivory or bones (see bone char).</p> <p>Vine black was traditionally produced by charring desiccated grape vines and stems.</p> <p>Lamp black was traditionally produced by collecting soot, also known as lampblack, from oil lamps.</p> <p>Newer methods of producing carbon black have superseded these traditional sources, although some materials are still produced using traditional methods. For artisanal purposes, it is very useful.</p>
Lapis lazuli Mineral form		<p>Lapis lazuli is a rock, not a mineral: whereas a mineral has only one constituent, lapis lazuli is formed from more than one mineral.[2]</p> <p>The main component of lapis</p>

		<p>lazuli is lazurite (25% to 40%), a feldspathoid silicate mineral composed of sodium, aluminium, silicon, oxygen, sulfur, and chloride. Its formula is $(\text{Na,Ca})_8(\text{AlSiO}_4)_6(\text{S,SO}_4,\text{Cl})_{1-2}$.^[3] Most lapis lazuli also contains calcite (white), sodalite (blue) and pyrite (metallic yellow). Other possible constituents are augite, diopside, enstatite, mica, hauynite, hornblende and nosean. Some contain trace amounts of the sulfur rich lollingite variety <i>geyerite</i>.</p>
<p>Lazurite (Lapis Lazuli) Afghanistan Blue</p>		
<p>Malachite Mineral form</p>		<p>Malachite is a carbonate mineral normally known as "copper carbonate" with the formula $\text{Cu}_2\text{CO}_3(\text{OH})_2$. This green-colored mineral crystallizes in the monoclinic crystal system, and most often forms botryoidal, fibrous, or stalagmitic masses. Individual crystals are rare but do occur as slender to acicular prisms.</p>
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<p>Mercury(II) oxide Mineral form</p>		<p>Mercury(II) oxide, also called mercuric oxide, has a formula of HgO and a formula weight of 216.6. It has a red or orange color. Mercury(II) oxide is a solid at room temperature and pressure. Mineralogical form called montroydite is very rarely found.</p>
<p>Ochre Mineral form General http://www.clearwelcaves.com/ochre.html</p>		 <p>Ochre colours vary from pocket to pocket, we maintain the variety and uniqueness of colour from each natural pocket where possible</p>
<p>Ochre Gold and Orange</p>		<p>Yellow ochre, $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$, a hydrated iron oxide</p>
<p>Ochre Red</p>		<p>Red ochre, Fe_2O_3, the anhydrate of yellow ochre, which turns red when heated, as this drives off the water ligands.</p>
<p>Ochre Purple</p>		<p>Purple ochre, identical to red ochre chemically but of a different hue caused by different light diffraction properties associated with a greater average particle size</p>
<p>Ochre Brown (Goethite)</p>		

Orpiment Mineral form		Orpiment As₂S₃ , is a common monoclinic arsenic sulfide mineral. It has a Mohs hardness of 1.5 to 2 and a specific gravity of 3.46. It melts at 300 °C to 325 °C. Optically it is biaxial (-) with refractive indices of a=2.4, b=2.81, g=3.02.
Orpiment		
Pyrolusite		Pyrolusite is a mineral consisting essentially of manganese dioxide (MnO ₂) and is important as an ore of manganese. It is a soft, black, amorphous appearing mineral, often with a granular, fibrous or columnar structure, sometimes forming reniform crusts. It has a metallic luster, a black or bluish-black streak, and readily soils the fingers. The specific gravity is about 4.8.
Pyrolusite Dendritic		
Pyrolusite Black Earth		manganese dioxide (MnO ₂) used as a pigment
Realgar Mineral form		Realgar , α-As₄S₄ , is an arsenic sulfide mineral. It is a soft, sectile mineral occurring in monoclinic crystals, or in granular, compact, or powdery form, often in association with the related mineral, orpiment (As ₂ S ₃). It is orange-red in

		<p>colour, melts at 320 °C, and burns with a bluish flame releasing fumes of arsenic and sulfur. Realgar is soft with a Mohs hardness of 1.5 to 2 and has a specific gravity of 3.5. Its molecular weight is 106.99. Its streak is orange colored. Realgar has a sub-metallic luster.</p>
Red Ochre		
Selenite (Gypseous White)		
<p>Shungite (Carbon Black)</p> <p>(see also Lampblack)</p>		<p>Not of importance in Asia</p> <p>Source It is found only in the Zazhoginskoye deposit near Lake Onega in the Shunga region of Karelia, Russia. As a pigment it exhibits excellent hiding power, and in mixtures with other pigments imparts a deep black tone with a cool tint. In the former Soviet Union, an artist's colors manufacturer made high quality paint under the name of "Shungite Natural Black."</p>
Siderite		
Sienna, Raw		<p>Sienna, in and of itself, is sometimes referred to as "raw sienna", in order to differentiate it from "burnt sienna", which is a more common pigment than the raw form. The difference is in the process applied to burnt sienna, which is raw sienna heated to remove the water from the clay and redden its brownish colour.</p>

Silver		
Turquoise		<p>Turquoise is an opaque, blue-to-green mineral that is a hydrous phosphate of copper and aluminium, with the chemical formula $\text{CuAl}_6(\text{PO}_4)_4(\text{OH})_8 \cdot 4\text{H}_2\text{O}$. It is rare and valuable in finer grades and has been prized as a gem and ornamental stone for thousands of years owing to its unique hue.</p>
Turquoise Gem Quality Robin's egg blue		<p>Used extensively in elite jewelry in Tibetan ethnic areas</p>
Umber		<p>Umber is a natural brown clay pigment which contains iron and manganese oxides. The colour becomes more intense when calcined (heated), and the resulting pigment is called burnt umber. Its name derives from the Latin word <i>umbra</i> (shadow) and was originally extracted in Umbria, a mountainous region of central Italy,^[1] but it is found in many parts of the world. Chemical formula: $\text{Fe}_2\text{O}_3 + \text{MnO}_2 + n\text{H}_2\text{O} + \text{Si} + \text{Al}_2\text{O}_3$</p>

<p>Vivianite</p>		<p>Vivianite $\text{Fe}_3(\text{PO}_4)_2 \cdot 8(\text{H}_2\text{O})$, hydrated iron phosphate, is a secondary mineral found in a number of geological environments. Usually found as deep blue to deep bluish green prismatic to flattened crystals, most crystals rather small to microscopic, larger ones are rare.</p>
<p>Volkonskoite Mineral form</p>		<p>Not of importance in Asian Art</p> <p>Efimyatskaja Perm, Ural Mts., Russia.</p>