Various chatoyant stones – a comparative overview

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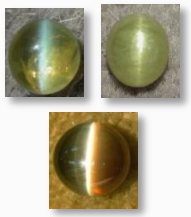
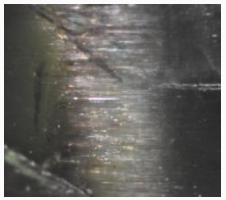
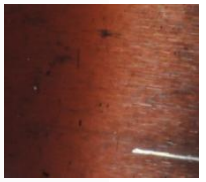
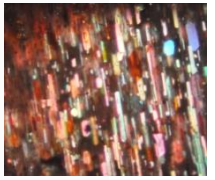
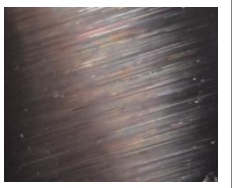
Chatoyancy is one of the most common optical effects observed in many gemstones, as a result of presence of elongated inclusions arranged in one direction with the stone being cut with a curved surface (example, cabochon). The most widely used and well known gemstone exhibiting this optical effect is a chrysoberyl, however as mentioned above, it can be present in any stone, provided it has the prerequisites. Some of the other gemstones exhibiting this phenomena and commonly available on the gem market include apatite, diopside, opal, quartz, scapolite and sillimanite, which are only few to name. This article provides an overview of the above mentioned cat's eye gemstones, once shown to the author by Mrs. Shyamala Fernandes of Jaipur. This however does not provide a hardcore technical data and thorough analysis, but it gives an insight and a comparative look of various types of cat's eyes in these gems. While students have always found it difficult to separate the chatoyant gems, this chart will prove useful to such readers.

							
Stone name	**Apatite**	**Chrysoberyl**	**Diopside**	**Opal**	**Quartz**	**Scapolite**	**Sillimanite (Fibrolite)**
Visual appearance	Available in various colours with moderate to sharp and fine ray. Dull vitreous lustre.	Usually in yellow, green and brown colours with sharp and fine ray; often with bluish tints.	Usually in dark green colour with sharp ray; often with silvery / bronzy ray. Bright vitreous lustre.	Available in various colours like yellow, brown, white, orange. Ray may be sharp but usually not	Usually in green, gray, yellow and white colours. Ray varies from sharp to broad. Vitreous lustre.	Usually in brown colours; yellow often encountered. Ray is quite sharp.	Available in various colours like brown, gray, white, yellow, etc. Fine and sharp ray; sometimes similar to that of

		Bright vitreous lustre.		straight as in other cat's eyes.			chrysoberyl. Bright vitreous lustre.
Refractive Index / DR	1.630 – 1.640 / 0.002 to 0.004	1.750 – 1.760 / 0.008 to 0.010	1.670 – 1.700 / 0.030	1.45 (mean) / No DR	1.544 – 1.553 / 0.009	1.540 – 1.580 / Up to 0.020	1.658 – 1.678/ 0.020
Birefringence Blink	Usually none observed	Low	Distinct	None	Low	Moderate	Moderate
Specific Gravity	3.17 to 3.23	3.71 to 3.72	3.29	2.00 (mean)	2.65	2.63 to 2.71	3.25
Absorption Spectrum	Fine lines at around 580 nm and 520 nm.	Strong band at 444 nm.	Bands may be seen at 505, 493 and 446 nm.	None	Usually None	None for the colours mentioned here.	Bands at 462, 441 and 410 nm.
UV Fluorescence	Variable. Pinkish to mustard yellow in LW as well as SW.	Inert	Inert	Variable. Blue to white or green.	Inert	Pink to red in SW.	Some light colours may show orange –red.
Inclusions / cause of cat's eye	 Fine growth tubes, often filled with some iron based compounds like ilmenite.	  Fine short iridescent discs or needles may be seen.	 Fine short needles and discs	 Zones of some iron-rich fibrous inclusions.	 Zones of fine discs	  Fine blade like needles or platelets of hematite	 Fine long fibres; cleavage planes at base

References:

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Gubelin E.J. & Koivula J.I. (2008) *Photoatlas of Inclusions in Gemstones, Volume 3*, Opinio Publishers, Basel, Switzerland

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