

GEM IDENTIFICATION CHART

Chart 1 of 2 · پٽا — پٺڀٽا پٽڀٽا پٽڀٽا پٽڀٽا Hematite پٽا— Apatite

GEM MATERIAL	COLORS	TRANSP.	VISUAL CHAR.	REFRACTIVE INDEX			OP. CHAR.	PLEOCH.	VARIETIES	SPECTRUM	UV FLUOR.	SG	HARD.	COMMENTS
				RI (norm)	Range	Biref.								
Hematite	Gr,BI	Opaque	Metallic luster	2.940-3.220	-0.07	0.28	AGG, Hexagonal	—	—	—	—	5.20; +0.08, -0.25	5% to 6%	Streak test- reddish brown
Diamond	All colors	Tp to Opaque	Adamantine luster	2.417	—	—	SR, Cubic	—	—	415.5 in cape series	LW-in to str, SW-in	3.52 ±0.01	10	High thermal conductivity
CZ	All colors	Tp	Strong dispersion	2.15	0.03	—	SR, Cubic	—	—	—	LW&SW-in to mod	5.8 ±0.02	8%	—
Sphene	O,Y,G,Br	Tp	Very strong doubling	1.900-2.034	+ -0.020	0.1, -0.135	DR,B+,Monoclinic	Tri, mod to strong	—	580 doublet	LW&SW-inert	3.52 ±0.02	5 to 5%	Abraded facet edges, doubling
Zircon	C,P,R,O,Y,G,B,Br	Tp to S-Tp	C(rare),Subadamantine luster	1.925-1.984	0.04, -0.145	0.000 to 0.059	DR,U+,Tetragonal	Di, weak to strong	—	653.5 line	LW&SW-in to mod	4.7; 0.03, -0.80	6 to 7%	Abraded facet edges, doubling
Andradite	Y,G,Br,BI	Tp to O	C(rare)	1.888	0.007, -0.033	—	SR, Cubic	—	Demantoid, Melanite	440.0 line	LW&SW-inert	3.84 ±0.03	6% to 7	Demantoid-Horse tail like inclusions
Spessartite	R,O,Br	Tp	Color contains some orange	1.81	0.004, -0.02	—	SR, Cubic	—	—	412, 430 bands key	LW&SW-inert	4.15; 0.05, -0.03	7 to 7%	—
Almandite	P,R,Br	Tp to S-TI	A,often dark in tone	1.79	±0.030	—	SR, Cubic	—	—	505, 525, 575 bands	LW&SW-inert	4.05; 0.25, -0.12	7 to 7%	Needle-like incls intersect at 70° and 110°
Corundum	All colors	Tp to O	A,CC,C(rare)	1.762-1.770	0.009, -0.005	0.008, -0.010	DR,U-,Trigonal	Di, weak to strong	Ruby, Sapphire	varies with color	LW&SW-in to strong	4.00; 0.10, -0.05	9	silk, rutile needles intersecting at 60° and 120°
Syn. Corundum (FI)	All colors	Tp to Opaque	A,CC,C(rare)	1.762-1.770	0.005, -0.003	0.008	DR,U-,Trigonal	Di, weak to strong	Ruby, Sapphire	varies with color	LW&SW-in to strong	4.00; ±0.03	9	gas bubbles, curved striations
Syn. Corundum (F)	All colors	Tp	—	1.762-1.770	—	0.008	DR,U-,Trigonal	Di, mod to strong	Ruby, Sapphire	varies with color	LW&SW-in to strong	4.00; ±0.03	9	flux, flux fingerprint, metallic inclusions, wispy veil
Rhodolite	P,R	Tp	Purple to purplish red color	1.76	0.010, -0.020	—	SR, Cubic	—	—	505, 525, 575 bands	LW&SW-inert	3.84; ±0.01	7 to 7%	—
Chrysoberyl	P,R,Y,G,B,Br	Tp to O	C,CC	1.746-1.755	0.004, -0.006	0.008, -0.010	DR,B+,Orthorhombic	Tri, weak to strong	Alexandrite, cat'seye	varies with color	LW-in to weak	3.73; ±0.02	8%	Syn Alexandrite has slightly lower RI and stronger fluo than nat.
Pyrope	R	Tp	Often very dark in tone	1.746	0.010, -0.026	—	SR, Cubic	—	—	505, 560 broad bands	LW&SW-inert	3.78; 0.09, -0.16	7 to 7%	—
Grossularite	O,Y,G,Br	Tp to S-Tp	—	1.74	0.020, -0.010	—	SR, Cubic	—	Hessonite, Tsavorite	varies with color	LW&SW-inert to mod	3.61; 0.12, -0.04	7 to 7%	Hessonite-Heat wave effect
Azurite	B	TI-O	—	1.730-1.836	+ -0.010	0.106	AGG, Monoclinic	Tri, strong to mod	—	—	—	3.80; 0.09, -0.50	3% to 4	generally associated with malachite, intergrowth called azurmalachite
Hydrogrossular	G,Br	TI-O	—	1.72	0.010, -0.030	—	AGG, Cubic	—	—	varies with color	LW&SW-inert	3.47; 0.08, -0.32	7	—
Syn. Spinel	All colors	Tp-O	C C , C o l o r l e s s , l i g h t Y , G , B , d a r	1.728	0.012, -0.008	—	SR, Cubic	—	—	varies with color	LW&SW-in to strong	3.64; 0.02, -0.12	8	Syn blue spinel SW-Chalky blue fluo
Spinel	All colors	Tp-O	C C (r a r e) , c o l o r s o f t e n l o w i n	1.718	0.017, -0.008	—	SR, Cubic	—	—	varies with color	LW-in to str, SW-in	3.60; 0.10, -0.03	8	Octahedral crystals as inclusions
Kyanite	C,G,B	Tp	C(rare)	1.716-1.731	+ -0.004	0.012-0.017	DR,B-,Triclinic	Tri, mod	cat's eye	435, 445 bands	LW-in to weak	3.68; 0.01, -0.12	4 to 7%	Directional hardness
Zoisite	R,G,B,V,Br,Gr	Tp-O	C(rare),very strong pleochroism	1.691-1.700	+ -0.005	0.008-0.013	DR,B+,Orthorhombic	Tri, strong	Tanzanite	varies with color	LW&SW-inert	3.35; 0.10, -0.25	6 to 7	—
Diopside	G,B,V,BI	Tp-O	A,C	1.675-1.701	0.029, -0.010	0.024-0.030	DR,B+,Monoclinic	Tri, weak to mod	cat's eye, star	505 line common	—	3.29; 0.11, -0.07	5% to 6	cat's eye commonly green, star-4 rayed star commonly black
Enstatite	G,Br	Tp-TI	C,A(rare),often dark in tone	1.663-1.673	+ -0.010	0.008-0.011	DR,B+,Orthorhombic	Tri, weak to strong	—	505, 550 lines	LW&SW-inert	3.25; 0.15, -0.02	5 to 6	—
Spodumene	P,R,Y,G,B,V,Gr	Tp	—	1.660-1.676	+ -0.005	0.014-0.016	DR,B+,Monoclinic	Tri, weak to strong	Kunzite, Hiddenite	varies with color	LW-in to str, SW-weak	3.18; ±0.03	6% to 7	Kunzite-pale pink, Hiddenite-pale green
Sillimanite	G,B,Br,W,Gr	Tp-O	C	1.654-1.670	0.004, -0.006	0.011-0.015	DR,B+,Orthorhombic	Tri, mod to strong	—	—	—	3.25; 0.2, -0.11	6 to 7%	generally-fibrous, also known as fibrolite
Jadeite	All colors	S-Tp to O	often greasy to waxy luster	1.660spot	+ -0.008	—	AGG, Monoclinic	—	—	437 line	LW-in to strong	3.34; 0.06, -0.09	6 to 7%	—
Malachite	G	O	Banded with 2 or more tones of G	1.655-1.909	—	0.254	AGG, Monoclinic	—	—	—	LW&SW-inert	3.95; 0.15, -0.70	3% to 4	curved or angular banding
Peridot	Y,G,Br	Tp	—	1.654-1.690	+ -0.020	0.035-0.038	DR,B+,Orthorhombic	Tri,weak to mod	—	457,477,497 lines	LW&SW-inert	3.34; 0.14, -0.07	6% to 7	lily pad like inclusions
Andalusite	R,O,Y,G,Br,W,Gr,BI	Tp-O	very strong pleochroism	1.634-1.643	+ -0.005	0.007-0.013	DR,B-Orthorhombic	Tri,strong	—	varies with color	LW-in, SW-in to mod	3.17; ±0.04	7 to 7%	var:chiastolite, Ti-O, with dark cross like pattern on Br material
Tourmaline	All colors	Tp-O	C,CC(rare),strong dichroism	1.624-1.644	0.011, -0.009	0.018-0.020	DR,U-,Trigonal	Di,weak to strong	—	varies with color	LW&SW-in to weak	3.06; 0.20, -0.06	7 to 7%	trichite inclusions, confused with andalusite, topaz and apatite
Apatite	C,P,R,Y,G,B,V,Br	Tp-TI	C	1.634-1.638	0.012, -0.006	0.002-0.008	DR,U-,Hexagonal	Di, weak to strong	—	varies with color	LW&SW-in to weak	3.18; ±0.05	5	580 doublet in C, Y, ;confused with andalusite, tourmaline, topaz

COLORS

C-Colorless · R-Red · P-Pink · O-Orange · Y-Yellow · G-Green · B-Blue · V-Violet · W-White · Br-Brown · Gr-Gray · BI-Black

TRANSPARENCY

Tp-Transparent · S-Tp-Semi-Transparent · TI-Translucent · S-TI-Semi-Translucent · O-Opaque

PHENOMENA

A-Asterism · Ad-Adularescence · Av-Aventurescence · CC-Color change · C-Chatoyancy · I-Iridescence · L-Labradorescence · O-Opalescence · P-Play of color

GEM IDENTIFICATION CHART

Chart 2 of 2 · پٽ• — پٺپ— پæúýþþžžÜX þ-þþç þ-þ´üþ· þžþ· þ©þ·þþä Topaz þžþ— Fluorite

GEM MATERIAL	COLORS	TRANSP.	VISUAL CHAR.	REFRACTIVE INDEX			OP. CHAR.	PLEOCH.	VARIETIES	SPECTRUM	UV FLUOR.	SG	HARD.	COMMENTS
				RI (norm)	Range	Biref.								
Topaz	P,R,O,Y,G,B,V,Br	Tp	—	1.619-1.627	±0.010	0.008-0.010	DR,B+,Orthorhombic	Tri, weak to mod	—	—	LW-in to weak	3.53; ±0.04	8	incl-two immiscible liquids, RI varies with colour; Y,O,higher RI
Turquoise	B,G	S-TI to O	matrix possible	1.61	—	—	AGG,Triclinic	—	—	420,432 bands	LW-in to weak	2.76; 0.14, -0.36	5 to 6	may be dyed, Syn. Turquoise-cream of wheat
Nephrite	R,Y,G,Br,W,Gr,BI	TI-O	Often greasy to waxy luster	1.61	0.009, -0.008	—	AGG,Monoclinic	—	—	500 line	LW&SW-inert	2.95; 0.15, -0.05	6 to 6 ½	tough, may be confused with jadeite
Rhodochrosite	R,W,Br,Gr	Tp-O	pink and white banding in aggregate	1.597-1.817	±0.003	0.22	DR,U-,Hexagonal	Di, mod to strong	—	551 band	LW&SW-inert to mod	3.60; 0.10, -0.15	3 ½ to 4 ½	effervesces to HCl, TI-O-banded;bacon strip effect
Beryl	C,P,R,O,Y,G,B,Br,Gr	Tp-O	C, A (rare)	1.577-1.583	±0.017	0.005-0.009	DR,U-,Hexagonal	Di, weak to strong	Emerald, Aquamarine etc.	varies with color	LW&SW-in to strong	2.72; 0.18, -0.05	7 ½ to 8	incl-2 phase, 3 phase, emerald may be oiled
Syn. Emerald (Hydro)	G	Tp	—	1.568-1.573	0.008, -0.003	0.005-0.007	DR,U-,Hexagonal	Di, weak to strong	—	same as natural	LW&SW-in to strong	2.68; ±0.03	7 ½ to 8	nail head spicules, chevron growth, wispy incl, seed plate, fluoresces red
Syn. Emerald (Flux)	G	Tp	—	1.561-1.564	0.01	0.003-0.008	DR,U-,Hexagonal	Di, weak to strong	—	same as natural	LW-in to st, SW in to mod	2.66; 0.03, -0.01	7 ½ to 8	flux incl may be wispy, metallic incl, phenakite xtl, st. growth
Serpentine	Y,G,Br,W,BI	S-Tp to O	waxy to greasy luster, resembles jade	1.560-1.570	0.004, -0.070	—	AGG,Monoclinic	—	—	—	LW-in to weak	2.57; 0.23, -0.13	2 to 6	poor polish, often shows scratches, confused with chalcedony
Coral (conchiolin)	Y,Br,BI	S-TI to O	concentric circular (tree ring) structure	1.560-1.570	±0.010	—	AGG	—	—	—	LW&SW-inert	1.35; 0.77, -0.05	3	organic in origin
Labradorite	C,O,Y,G,B,Br,Gr,BI	Tp-O	L,A,C (rare), L-often blue to green en	1.559-1.568	±0.006	0.009	DR,B+,Triclinic	Tri, weak to mod	—	—	LW-inert to weak	2.70; ±0.05	6 to 6 ½	feldspar; black, needle like inclusions, metallic appearing platelets
Tortoise shell	Y,Br,W,BI	S-Tp to TI	mottled coloration, resinous luster	1.55	-0.01	—	SR,Amorphous	—	—	—	LW&SW-in to strong	1.29; 0.06, -0.03	2 ½	organic in origin
Quartz	All colours	Tp-O	A,Av,C,I	1.544-1.553	0	0.009	DR,U+,Trigonal	Di, weak to strong	Rock crystal, Amethyst etc	—	LW&SW-inert to weak	2.65; 0.03, -0.02	7	polariscope-bull's eye; syn quartz-hydrothermal
Iolite	B,V,Br	Tp-TI	A,Av,C (rare), strong trichroism	1.535-1.545	0.045, -0.011	0.008-0.012	DR,B-,Orthorhombic	Tri, mod to strong	—	—	LW&SW-inert	2.61; ±0.05	7 to 7 ½	often confused with amethyst, pleochroism key test
Ivory (elephant)	Y,Br,W	TI-O	engine turned effect, greasy to dull lustre	1.54	-0.005	—	AGG	—	—	—	LW&SW-weak to str blue	1.85; ±0.15	2 ½	effervesces to HCl, confused with other animal ivory
Amber	R,O,Y,G,B,V,Br,W	Tp-O	resinous luster	1.54	0.005, -0.001	—	SR,Amorphous	—	—	—	LW-in to str, SW-weaker	1.08; 0.02, -0.08	2 to 2 ½	fossilised resin, insects and organic incl, resinous odor to hot point
Oligoclase	R,O,Y,Br,W,Gr	Tp to S-TI	Av, orange sheen common	1.539-1.547	0.004, -0.006	0.007-0.010	AGG,DR,B-,Triclinic	—	Sunstone	—	LW&SW-inert to weak	2.64; 0.02, -0.03	6 to 6 ½	Feldspar; red or orange platy incl, confused with goldstone glass
Chalcedony	All colours	S-Tp to O	I	1.535-1.539	—	0.000-0.004	AGG,Trigonal	—	Agate, Onyx etc	—	LW&SW-inert to mod	2.60; 0.10, -0.05	6 ½ to 7	may be banded, moss-like dendritic incl, dyed green and dyed blue
Pearl	All colours	TI-O	O, Dull to submetallic luster	1.530-1.685	—	0.155	AGG	—	—	—	LW&SW-inert to strong	2.71; 0.15, -0.09	2 ½ to 4	organic in origin, gritty to cutting edges of teeth, nat and cul-x-ray
Shell	All colours	TI-O	O	1.530-1.685	—	0.155	AGG	—	—	—	LW&SW-inert to mod	2.86; 0.03, -0.16	3 ½	organic in origin, e.g., mother-of-pearl
Microcline	O,G,B,W	TI-O	grid-like surface, often with sheen	1.533-1.530	±0.004	0.008	AGG,DR,B-,Triclinic	—	Amazonite	—	LW-in to weak, SW-weak	2.56; ±0.02	6 to 6 ½	Feldspar; grid-like intergrowth of bluish green and white
Orthoclase	C,O,Y,Br,W,Gr	Tp to S-TI	A,Ad,C, vitreous to pearly luster	1.518-1.526	±0.010	0.005-0.008	DR,B-,Monoclinic	Tri, weak	Moonstone	—	LW&SW-inert to weak	2.58; ±0.03	6 to 6 ½	Feldspar; adularescence, centipede like incl
Lapis Lazuli	B,V	S-TI to O	—	1.670, 1.500	—	—	SR,AGG	—	—	—	LW&SW-inert to mod	2.75; ±0.25	5 to 6	A Rock, essentially lazurite with white calcite, pyrite ; HCl-rotten egg odor
Obsidian	All colours	Tp-O	I,C (rare)	1.49	0.020, -0.010	—	SR,Amorphous	—	Natural Glass	—	—	2.40; 0.10, -0.07	5 to 5 ½	volcanic origin, may contain gas bubbles, crystallites, needles
Moldavite	G	Tp to S-Tp	low saturation common	1.49	0.020, -0.010	—	SR,Amorphous	—	Natural Glass	—	LW&SW-inert	2.36; ±0.04	5 ½	round and elongated gas bubbles, flow lines common
Calcite	All colours	Tp-O	extreme doubling in single crystals	1.486-1.658	—	0.172	DR,U-,Trigonal	—	—	—	LW&SW-inert to mod	2.70; ±0.05	3	effervesces to HCl, massive varieties (marble, onyx marble)
Coral (calcareous)	R,O,W	S-TI to O	waxy parallel fibrous structure	1.486-1.658	—	0.172	AGG	—	—	—	LW&SW-inert to strong	2.70; ±0.05	3 ½ to 4	organic in origin, from polyps, effervesces to HCl
Sodalite	B,V	S-Tp to O	commonly resembles lapis lazuli	1.483	—	±0.003	SR or AGG,Cubic	—	—	—	LW&SW-inert to weak	2.25; ±0.10	5 to 6	color more violet than lapis lazuli, white veining common, pyrite rare
Opal	All colours	Tp-O	P,A,C (rare), may or may not have P	1.45	0.020, -0.000	—	SR,Amorphous	—	—	—	LW&SW-inert to strong	2.15; 0.08, -0.00	5 to 6 ½	syn opal shows snake skin pattern under magnification
Glass (Man-made)	All colours	Tp-O	A,Ad,Av,C,CC,I,O,P	1.470 to 1.700	—	—	SR,Amorphous	—	—	—	LW&SW-inert to strong	2.30 to 4.50	5 to 6	gas bubbles, flow lines, warm to touch, may imitate any gemstone
Plastic	All colours	Tp-O	A,Ad,Av,C,O,P	1.460 to 1.700	—	—	SR,Amorphous	—	—	—	LW&SW-inert to strong	1.30; ±0.25	1 ½ to 3	gas bubbles, flow lines, warm to touch, rounded facet junctions
Fluorite	All colours	Tp-TI	CC	1.434	±0.001	—	SR,Cubic	—	Blue John	—	LW-in to strong, SW-weak	3.18; 0.07, -0.18	4	color zoning, 2 or 3 phase incl, often fluoresces

COLORS

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TRANSPARENCY

T-Transparent · S-Tp-Semi-Transparent · TI-Translucent · S-TI-Semi-Translucent · O-Opaque

PHENOMENA

A-Asterism · Ad-Adularescence · Av-Aventurescence · CC-Color change · C-Chatoyancy · I-Iridescence · L-Labradorescence · O-Opalescence · P-Play of color