Properties of Gemstones

Mineral	Gem	Color	Mohs hardness	Specific gravity	Refractive index	Crystal system	Other	Fluorescence	Dispersion	Inclusions
beryl	aquamarine	sky blue	7.5-8.0	2.68-2.71	epsilon = 1.570-1.580 omega = 1.574-1.586	hexagonal crystal system; conchoidal fracture	transparent; weakly pleochroic	none to weak; synthetic stones may appear opaque and dull red in longwave UV		Aquamarines are often flawless; Other contain many inclusions such as mica, pyrite and calcite
	goshenite	colorless								
	heliodor	yellow								
	emerald	green		2.68-2.78	epsilon = 1.571-1.581 omega = 1.577-1.588					
	morganite	pink		2.66-2.83	epsilon = 1.580-1.590 omega = 1.589-1.601					
chrysoberyl	alexandrite	green in daylight, red in incandescent light	8.5	3.5-3.8	alpha = 1.745 beta = 1.748 gamma = 1.754	orthorhombic, flattened crystals, often twinned	transparent; chrysoberyl cat's-eye is chatoyant	strongly pleochroic	d = 0.015	
cristobalite	opal	milky white to colorless;; variable pale shades	5.5-6.5	1.98-2.25	1.435-1.455	tetragonal submicrocrystalline aggregates; irregular concretions; glass-like fracture	opaque; contains some water causing the physical properties to vary	may fluoresce white or pale green; may phosphoresce		possible
corundum	sapphire	blue	9.0	4.0	epsilon = 1.757-1.768 omega = 1.765-1.776	hexagonal; conchoidal fracture	transparent; marked dichroism	orange to red; heat treated stones may fluoresce green	d = 0.018	many including minerals (rutile), fluids, angular banding
	ruby	red								
	padmaradschah	orange								
diamond	diamond	variable (colorless, yellow, blue)	10.0	3.52	2.4175	isometric flattened octahedrons; dodecahedrons	transparent; perfect cleavage in four directions	may fluoresce pale colors in longwave UV; may phosphoresce	d = 0.044	trigonal on surface; numerous inclusions
potash feldspar	orthoclase	pale yellow to flesh red	6.0-6.5	2.6	alpha = 1.518 beta = 1.522 gamma = 1.522	monoclinic crystals	two perfect cleavages at right angles			
	moonstone	colorless, white to yellowish				nodules or masses	blue opalecsence			
	amazonite	yellow green to blue green				triclinic, large crystals	variety of microcline			
plagioclase feldspar	sunstone (aventurine)	colorless to pale pink	6.0-6.5	2.6-2.7	alpha = 1.527-1.577 beta=1.531-1.585 gamma = 1.538-1.590	triclinic prismatic crystals; two perfect cleavages at right angles	transparent to opaque; iridescent;			inclusions give spangled appearance
	labradorite	grayish shades								
fluorite	fluorite	lavender to green			1.434	conchoidal fracture	transparent	strong		color zoning

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garnet	almandine (carbuncle)	deep red with a trace of purple	7.0-7.5	4.3	1.79-1.83	isometric euhedral crystals, with dodecahedrons and trapezodrons most common; conchoidal fracture	light colored varieties are transparent; no birefringence, no pleochroism	none	d = 0.024	needles; single and multiphase prisms
	andradite (Uralian emerald)	deep emerald-green	6.5-7.0	3.9	1.887			none	d = 0.057	
	grossularite (hessonite)	yellow-brown to orange, red, or green	7.0-7.5	3.6	1.734-1.740			pale orange in long UV; yellow in short UV	d = 0.028	
	pyrope	dark blood red	7.0-7.5	3.78	1.714-1.742			none	d = 0.027	
	spessartine	yellow-orange to brown-red	7.0-7.5	4.15	1.800-1.810			none	d = 0.027	
jade	jadeite (Imperial jade)	green but may be white, black, red, brown, yellow, blue or mauve	6.0	3.33-3.34	alpha = 1.640-1.658 beta=1.645-1.663 gamma = 1.652-1.673	monoclinic compact or fibrous masses; granular to splintery fracture	translucent to opaque; greasy luster	may have pale white color in long UV light		
	nephrite	deep spinach green to near-white	6.0-6.5	2.96-3.02	alpha = 1.600-1.672 beta=1.614-1.686 gamma = 1.627-1.693	monoclinic compact masses; conchoidal to granular fracture	translucent to opaque; greasy or waxy appearance	none		some dark inclusions
lazurite	lapis lazuli	azure blue with flecks of white and gold	5.0-5.5	2.7-2.9	1.50-1.67	isometric with compact masses; opaque	decomposed by hydrochloric acid			
olivine	peridot; chrysolite	yellow green; dark bottle green; olive green	6.5-7.0	3.3-3.4	alpha = 1.635-1.671 beta = 1.652-1.698 gamma = 1.671-1.707	orthorhombic system with massive or granular forms; fracture=uneven to conchoidal	transparent		d = 0.020	
quartz	amethyst	purple	7.0	2.65	epsilon = 1.553 omega = 1.544	conchoidal fracture	transparent; heat treatment may bleach stones		d = 0.013	
	cairngorm (smoky quartz)	smoky brown								
	citrine	yellow								
	rock crystal	colorless								
	rose quartz	pink								
	agate (moss agate, mocha stone)	variable				compact masses; nodules	translucent to opaque			
	chalcedony (onyx, carnelian, sardonyx, chrysoprase, bloodstone, heliotrope)	variable								
	jasper	variable								

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spinel	Balas ruby;	typically red; also variable: yellow (rubicelle), violet (almandine), pleonast (blue, black), gahnite (blue-green)	8	3.6	1.715-1.725	isometric octahedral crystals; rounded grains; conchoidal fracture	transparent	natural fluoresces red in longwave UV; synthetic may show colors in shortwave UV	d = 0.020	fingerprint pattern inclusions
topaz	topaz, hyacinth	yellow, green, blue, violet or red	8	3.4-3.6	alpha = 1.606-1.629 beta = .609-1.631 gamma = 1.616-1.638	orthorhombic prismatic crystals; perfect cleavage in one direction	transparent; highly pleochroic; turns soft red when heated	may fluoresce yellow in longwave UV	d = 0.014	single and multiphase
tourmaline	achroite	colorless or green	7-7.5	2.9-3.2	epsilon = 1.610-1.650 omega = 1.635-1.675	hexagonal prismatic crystals, often rounded or oval; conchoidal fracture	transparent; pleochroic	none to weak	d = 0.016	gas and liquid pockets with color zoning
	dravite	brown								
	indicolite	blue								
	rubellite	pink								
	schorl	black								
	siberite	violet								
turquoise	turquoise	blue to greenish-blue	5.0-6.0	2.6-2.9	alpha = 1.61 beta = 1.62 gamma = 1.65	cryptocrystalline to fine granular; fracture=conchoidal	opaque; color fades in sunlight			
zircon	jargon	variable	6.0-7.5	4.6-4.7	epsilon = 1.968-2.015 omega = 1.923-1.960	tetragonal system with square prismatic crystals; fracture=uneven	transparent; pleochroic	some show dull yellow color; some may phosphoresce	d = 0.048	rutile crystals; single and multiphase
	Matura diamond	colorless								
	hyacinth	yellow orange								
	jacinth	red brown								