

Magnetic Susceptibility Index for Gemstones

©2010 Kirk Feral

Magnetic responses are standardized to 1/2" X 1/2" N-52 magnet cylinders.

Colorless and extremely pale stones of any species tend to be Inert (diamagnetic).

Black opaque stones of many species are strongly magnetic and may Pick Up or Drag.

Pick Up and Drag responses are weight-dependent. Direct responses on the Index apply to gems 1-4cts.

Larger gems may be too heavy to Pick Up or Drag. Smaller non-Garnet gems with strong magnetism may Pick Up.

Gemstone	Response Range	SI X 10 (-6) Range	Cause of Color
Actinolite			
Nephrite Jade (black)	Strong to Drags	321-577	Iron
Nephrite Jade (green)	Moderate to Drags	91-343	Iron, Chromium
Nephrite Jade (white, yellow)	Inert	< 0 (diamagnetic)	Iron
Pargasite (green)	Inert	< 0 (diamagnetic)	Iron, Vanadium
Pargasite (orangey brown)	Weak	35 SI	Iron
Afghanite (blue)	Inert	< 0 (diamagnetic)	Chromium, Vanadium
Alexandrite (see Chrysoberyl)			
Amber (any color)	Inert	< 0 (diamagnetic)	Charge Transfer involving Organic Compounds
Amblygonite-Montebrasite (blue, green)	Inert	< 0 (diamagnetic)	Iron, Manganese
Amethyst (see Quartz)			
Andalusite	Inert to Weak	< 0 -26	Iron-Oxygen-Titanium Charge Transfer
Apatite			
Transparent blue, green, yellow	Inert (Weak in rare cases)	< 0 (diamagnetic)	Mang., Rare-earth, Charge Transfer, Color Centers
Yellow, yellowish brown	Weak to Strong	< 20 - >120	Rare-earth Metals
Aquamarine (see Beryl)			
Astrophyllite	Strong	1146-1328	Iron, Manganese
Axinite			
Ferroaxinite (brown, bluish brown)	Drags	603-654 SI	Iron, Vanadium
Manganaxinite (yellow)	Drags	345-360 SI	Manganese, possibly Charge Transfer
Manganaxinite (opaque black end member)	Drags	998 SI	Manganese
Magnesoaxinite (near-colorless end member)	Weak	17 SI	Magnesium (colorless)
Azurite (opaque)	Strong	382 SI	Copper
Barite (pale brown, blue)	Inert	< 0 (diamagnetic)	Color Centers
Bastnasite (pale to dark)	Drags (Picks Up under 1ct)	654-898 SI	Cerium (a Rare-earth metal)
Benitoite	Inert	< 0 (diamagnetic)	Iron-Titanium Charge Transfer
Beryl			
Aquamarine (pale to medium blue)	Weak to Moderate	20-100	Iron, Iron-Iron Charge Transfer
Golden / Yellow Beryl	Inert to Weak	< 0-48	Iron
Heliodor (yellowish green)	Inert	< 0 (diamagnetic)	Chromium, Iron
Morganite	Inert	< 0 (diamagnetic)	Manganese
Blue Beryl (Maxixe)	Inert	< 0 (diamagnetic)	Color centers

Red Beryl (transparent Bixbite)	Strong	117 SI	Manganese
Green Beryl	Inert to Weak	< 20	Iron
Emerald	Inert to Moderate	<0-87	Chromium, Vanadium
Synthetic Emerald	Weak to Moderate	26-143	Chromium, Vanadium
Synthetic Red Beryl	Moderate to Strong	126 SI	Cobalt
Synthetic Aquamarine	Moderate	109 SI	Iron
Bismuth (native metal)	Diamagnetic	< 0 (diamagnetic)	Bismuth
Bumblebee "Jasper" (mineral aggregate)	Moderate to Strong	Varies within the stone	Sulfur, Arsenic, Hematite
Calcite			
Calcite			
Most Calcite Color Variations	Inert	< 0 (diamagnetic)	Iron, Manganese, Zinc
Pink Cobalto Calcite	Weak	22-26	Cobalt
Carneilian (see Quartz)			
Cassiterite (pale yellow)	Inert	< 0 (diamagnetic)	Iron
Cavansite (stabilized cab)	Moderate	> 82	Vanadium
Celestite (blue)	Inert	< 0 (diamagnetic)	Color Centers
Charoite	Weak	56-69	Manganese
Chondrodite	Inert	< 0 (diamagnetic)	Iron, Manganese
Chromite	Drags	Not Tested	Iron, Chromium
Chrysoberyl			
Chrysoberyl	Weak to Moderate	20-127	Iron
Alexandrite	Weak	43 SI	Chromium
Synthetic Alexandrite	Inert	< 0 (diamagnetic)	Chromium, Vanadium
Chrysocolla	Moderate-Strong	104-239	Copper
Chrysoprase (see Quartz)			
Citrine (see Quartz)			
Clinohumite			
Red Clinohumite	Weak	65 SI	Iron, Manganese
Orange Clinohumite	Strong	334 SI	Manganese, Iron
Clinozoisite	Drags	373 SI	Iron, Chromium
Cobaltite (purity unknown)	Strong	No Data	Cobalt, Arsenic
Copper			
Pure Copper	Inert	< 0 (diamagnetic)	Copper
Native Copper (impurities)	Strong	No Data	Copper (and impurities)
Coral	Inert	< 0 (diamagnetic)	Organic Pigments
Corundum			
Black Star Sapphire	Weak to Moderate	20-143	Iron, Titanium
Brown	Moderate	130 SI	Iron
Blue Sapphire (iron-rich igneous sources)	Weak to Moderate	22-82	Iron-Titanium & Iron-Iron Charge Transfer
Blue Sapphire (low-iron metamorphic sources)	Inert to Weak	< 0 -65	Iron-Titanium & Iron-Iron Charge Transfer
Green, Yellow, Orange, Padparadscha,Clr Change	Weak to Moderate	<20-117	Iron, Chromium, Various Charge Transfers
Purple, Pink	Inert to Weak	< 0-56	Chromium, Iron-Titanium Charge Transfer
Pale, Near-Colorless and Colorless	Inert	< 0 (Diamagnetic)	Insufficient Chromophores

Ruby	Weak, sometimes Moderate	<20-48 (sometimes 78-113)	Chromium, Vanadium, Iron
Synthetic Ruby (red corundum)	Inert to Weak	< 0-17	Chromium, Titanium
Synthetic Sapphire (any color except red)	Inert	< 0 (diamagnetic)	Titanium
Chrome Diopside (see Diopside)			
Cubic Zirconium (CZ)			
Most CZ colors	Inert to Weak	< 0-39	Various
Pink CZ	Drags	430-807	Rare-earth Metals
Color Change CZ (red to green)	Drags to Picks Up	1237 SI	Rare-earth Metals
Cuprite (transparent to opaque)	Weak	74 SI	Band Gap process
Danburite (yellow)	Inert	< 0 (diamagnetic)	Rare Earth Elements
Diamond (colorless, fancy colors, black)	Inert	< 0 (diamagnetic)	Color Centers (Nitrogen, Boron)
HTHP Synthetic Diamond (yellow,blue,colorless)	Inert to Picks Up (metal inclusions)	< 0 to Ferromagnetic	Color Centers (Nitrogen, Boron)
CVD Synthetic Diamond (colorless)	Inert	< 0 (diamagnetic)	N/A
Diaspore	Weak	39-48	Manganese, Iron, Chromium
Diopside			
Black Star Diopside	Picks Up	8,925- 9,960 Ferrimagnetic	Iron in Needle Inclusions of Magnetite
Chrome Diopside (chrome green)	Weak to Strong	56-296	Chromium, Vanadium, Iron
Vanadium Diopside (mint green)	Weak	< 20-39	Vanadium, Iron
Iron Diopside (grayish green)	Strong	122 SI	Iron, Chromium
Yellow Diopside	Weak	< 20	Iron
Violane (blue opaque Diopside)	Inert	< 0 (diamagnetic)	Manganese
Dolomite (transparent yellow/brown)	Inert	< 0 (diamagnetic)	Iron
Dumortierite	Weak	< 20	Various
Emerald (see Beryl)			
Enstatite			
Hypersthene (opaque black)	Drags to Picks Up	> 1298	Iron
Bronzite (opaque brown)	Drags to Picks Up	No Data	Iron
Enstatite (transparent brown, green)	Drags	308-681	Iron, Chromium
Eosphorite	Picks Up	2365 SI	Manganese, Iron
Epidote	Drags	491 SI	Iron
Euclase (pale blue, yellowish green)	Inert	< 0 (diamagnetic)	Iron
Eudialite (transparent to opaque)	Strong to Drags	345-469	Manganese, Iron
Feldspar Group			
Andesine Feldspar			
Untreated (yellow, reddish brown) Andesine	Weak	< 20	Iron, Copper
Diffused (red & green) Andesine	Weak	< 20	Copper, Iron
Bytownite Feldspar	Weak	35 SI	Iron
Labradorite Feldspar			
Oregon Sunstone (with copper schiller)	Weak	< 29	Microscopic Copper Inclusions
Oregon Sunstone (red, green)	Weak	< 29	Microscopic Copper Inclusions
Spectral Labradorite	Inert	< 0 (diamagnetic)	Light Diffraction
Spectral Labradorite with magnetite inclusions	Weak to Picks Up	< 20-1779	Light Diffraction
Yellow Labradorite	Weak	< 26	Iron

Microcline Feldspar			
Amazonite	Inert	< 0 (diamagnetic)	Color Centers involving Lead
Oligoclase Feldspar			
Sunstone (with Hematite, African & Indian)	Inert	< 0 (diamagnetic)	Iron (Hematite Inclusions))
Orthoclase Feldspar			
Moonstone Orthoclase	Inert	< 0 (diamagnetic)	Light Scattering
Yellow (Noble) Orthoclase	Weak to Moderate	65-104	Iron
Sanidine Feldspar	Moderate	No Data	Iron
Fluorite (any color)	Inert	< 0 (diamagnetic)	Color Centers (mostly)
Gadolinite (opaque)	Picks Up	8,780 SI	Iron, Beryllium, Rare-earth Metals
Garnet Group			
Almandine Garnet	Picks Up	1926-3094	Iron
Andradite Garnet			
Demantoid Garnet	Picks Up	2253-2752	Iron, Chromium
Brown Andradite & Topazolite	Picks Up	2559-2907	Charge Transfer involving Iron
Melanite (black) Garnet	Picks Up	1866 SI	Charge Transfer involving Iron
Irridescent Andradite	Picks Up	2930 SI	Light Diffraction (Interference Colors)
Grossular Garnet			
Hessonite (pale to dark yellow/orange)	Moderate to Strong	91-345	Charge Transfer involving Iron
Hydrogrossular (green, pink)	Weak to Strong	74-339	Iron, Chromium, Manganese
Mali Garnet	Drags	234-1099	Iron
Green Grossular (including Tsavorite & Merelani)	Weak to Strong	20-309	Vanadium, Chromium, Iron
Rosolite (pink)	Strong	147 SI	Manganese
Pyrope Garnet			
Standard Pyrope Garnet	Picks Up	1163-1971	Iron, Chromium, Vanadium
Rhodolite Garnet	Picks Up	1007-1890	Iron, Chromium, Vanadium
Malaya Garnet	Picks Up	1127-2689	Manganese, Chromium, Vanadium, Iron
Chrome Pyrope	Drags to Picks Up	454-999	Chromium, Iron
Pastel Pyrope	Drags to Picks Up	618-1236	Manganese, Chromium, Vanadium, Iron
Color-Change Pyrope	Picks Up	1445-2326	Manganese, Iron, Chromium, Vanadium
Spessartine Garnet			
Spessartine Garnet	Picks Up	4301-4728	Manganese, some Iron
Color-Change Spessartine	Picks Up	2435-4179	Manganese, Iron, Chromium, Vanadium
Malaya Garnet	Picks Up	2734-3089	Manganese, Iron, Chromium, Vanadium
Uvarovite Garnet	Picks Up	998 SI	Chromium, Vanadium
Synthetic Garnet			
GGG (Gadolinium Gallium Garnet) Any Color	Picks Up	6219-7404	Gadolinium (colorless) and Various dopants
SGG (Samarium Gadolinium Garnet) Yellow	Strong	291 SI	Samarium (a Rare-earth metal)
YAG (Yttrium Aluminum Garnet) Yellow	Inert to Weak	< 0-35	Various Dopants
YAG (Yttrium Aluminum Garnet) Green	Inert to Strong	< 0-352	Chromium
YAG (Yttrium Aluminum Garnet) Pink	Strong to Drags (rarely Picks Up)	356-391 (rare 5433)	Manganese
YAG (Yttrium Aluminum Garnet) Violet	Weak	30 SI	Neodymium
Gaspeite	Strong	859 SI	Nickel, Iron

Glass (man-made)			
Most Glass Colors	Inert	< 0 (diamagnetic)	Various
Blue Glass	Inert to Weak	< 0-61	Cobalt
Goldstone Glass (various colors)	Moderate to Strong	135-221	Copper particles, Cobalt, Manganese, Chromium
Glass/Garnet Doublet	Inert Glass side/ Strong Garnet side	794-942	Iron
Gold (pure 24k)	Inert	< 0 (diamagnetic)	Gold
Hauyne	Weak	No Data	Color Centers
Hematite (natural black and Specular)	Drags to Picks Up	2604-6853	Iron
Hematine (imitation Hematite)	Picks Up	> 86,000 Ferromagnetic	Iron
Hemimorphite (blue)	Inert	< 0 (diamagnetic)	Copper
Howlite (white or dyed)	Inert	< 0 (diamagnetic)	None or Man-made Dyes
Idocrase (green)	Strong	217-233	Iron
Iolite	Moderate-Strong	105-200	Iron, Iron-Iron Charge Transfer
Iron (native element)	Picks Up	Ferromagnetic	Iron
Ivory	Inert	< 0 (diamagnetic)	Organic
Jadeite Jade			
Green Jadeite	Weak to Moderate	65-104	Chromium, Iron
Orange Jadeite	Weak	< 20	Iron
Red Jadeite	Weak to Moderate	40-122	Iron
Purple Jadeite	Weak to Moderate	22-130	Iron -Iron Charge Transfer, Iron
White/Yellow Jadeite	Inert to Weak	< 0-48	Iron
Black Jadeite	Picks Up	2070 SI	Iron
Jeremejevite	Inert	<0 (diamagnetic)	Charge Transfer involving Iron
Jet	Inert	< 0 (diamagnetic)	Organic Carbon
Johachidolite	Inert	<0 (diamagnetic)	Not Known
Kornerupine (green)	Moderate to Strong	100-282	Iron, Chromium
Kunzite (see Spodumene)			
Kyanite			
Blue Kyanite	Inert, rarely Weak	< 0 - < 20	Iron- Titanium Charge Transfer
Green Kyanite	Weak	61 SI	Iron, Vanadium
Orange Kyanite	Moderate	95 SI	Iron and/or Manganese
Labradorite (see Feldspar)			
Lapis Lazuli	Inert	< 0 (diamagnetic)	Charge Transfer involving Sulfur
Lazulite (transparent blue)	Weak to Strong	No Data	Iron-Iron Charge Transfer
Libyan Desert Glass (natural glass)	Inert	< 0 (diamagnetic)	Iron
Magnetite	Picks Up	Ferrimagnetic	Iron
Malachite	Drags	477 SI	Copper
Maw Sit Sit	Moderate to Strong	139-230	Chromium, Iron
Moldavite (natural glass)	Weak	69 SI	Iron
Morganite (see Beryl)			
Muscovite/Mica			
Lepidolite (lavender)	Inert	< 0 (diamagnetic)	Lithium
Fuchsite	Weak	< 20-69	Chromium, Iron

Nephrite Jade (see Actinolite)			
Niccolite	Moderate	No Data	Nickel, Arsenic
Nummrite (Anthophyllite & Gedrite)	Drags	1094 SI	Light Diffraction in black matrix, Iron
Obsidian			
Mahogany Obsidian	Picks Up	1953 SI	Iron
Opaque Obsidian	Drags	304 -750	Iron
Translucent Obsidian	Strong	247 SI	Iron
Transparent Obsidian (black)	Weak to Moderate	74 -95	Iron
Transparent Obsidian (near-colorless)	Weak	22 SI	Iron
Onyx (see Quartz)			
Opal			
Precious Opal (with play of color)	Inert	< 0 (diamagnetic)	Light Diffraction
Common Opal (blue, pink, white)	Inert	< 0 (diamagnetic)	Copper, Diamagnetic Impurities
Blue Jelly Opal (no play of color)	Inert	< 0 (diamagnetic)	Light Scattering
Blue Opal (Chrysocolla in Opal)	Inert	<0 (diamagnetic)	Copper in Microscopic Gem Silica inclusions
Fire Opal from Mexico & Madagascar	Inert	<0 (diamagnetic)	Iron in Microscopic Iron Oxide Inclusions
Fire Opal from Brazil, Oregon	Weak	<20- 39	Iron in Microscopic Iron Oxide Inclusions
Prase Opal (green)	Weak	< 20	Nickel in Microscopic Chrysoprase Inclusions
Greenish Yellow "Kiwi" Opal (Madagascar)	Weak	< 0- 26	probably Iron, possibly Manganese
Boulder & Matrix Opal	Strong to Drags	Not Tested	Light Diffraction, Iron in the Host Matrix
Pearl	Inert	< 0 (diamagnetic)	Organic
Pectolite (blue Larimar)	Inert	< 0 (diamagnetic)	Copper
Peridot			
Green Peridot with saturated color	Drags	417-590	Iron
Near-colorless Peridot (Forsterite)	Weak	52 SI	Iron
Pezzottaite (Beryl Group)	Weak	< 20	Manganese
Plastic	Inert	< 0 (diamagnetic)	Various
Platinum	Strong	No data	Platinum
Prehnite (green)	Weak to Moderate	26-122	Iron
Psilomelane	Strong to Drags	343-1007	Manganese
Purpurite (translucent to opaque)	Drags to Picks Up	? - 1502	Manganese, Iron
Pyrite	Weak	43 SI	Iron-Sulphur properties
Pyromorphite (opaque)	Inert	< 0 (diamagnetic)	Copper, Iron
Pyrrhotite	Picks Up	Ferromagnetic	Iron
Quartz (macro-crystalline)			
Amethyst	Inert	< 0 (diamagnetic)	Charge Transfer involving Iron
Citrine	Inert	< 0 (diamagnetic)	Color Centers, Oxygen-Iron Charge Transfer
Madeira Citrine and rare yellow "Iron" Citrine	Weak	< 20- 26	Iron
Rock Crystal (colorless Quartz)	Inert	< 0 (diamagnetic)	None
Rose Quartz	Inert	< 0 (diamagnetic)	Microscopic Inclusions, Color Centers, Charge Tran.
Smoky Quartz	Inert	< 0 (diamagnetic)	Color Centers
Quartz with Inclusions			
Rutile, Hematite & Most Other Inclusions	Inert	< 0 (diamagnetic)	Varies with type of Inclusions

Tourmalinated Quartz	Weak	43-56	Iron in Tourmaline Macro Inclusions
Green Quartz (Hedenbergite Inclusions)	Weak	56 SI	Iron in Microscopic Hedenbergite Inclusions
Paraiba Quartz (Blue Paraiba Tourmaline Inclusion.)	Weak	56 SI	Copper, Manganese In Micr. Incl. of Paraiba Tourm.
Sunset Quartz	Inert	< 0 SI	Iron in Needle Inclusions- possibly Limonite
Tiger's Eye	Inert to Picks Up	< 0-3889 (varies with iron)	Iron oxide, Crocidolite Macro Inclusions
Hawk's Eye	Weak	< 20	Iron oxide, Crocidolite Macro Inclusions
Pietersite	Inert to Strong	< 0-305 (varies with iron)	Iron Oxide, Crocidolite Macro Inclusions
Chalcedony Quartz (microcrystalline)			
Most Agates & Jaspers	Inert	< 0 (diamagnetic)	Iron in Microscopic Iron Oxide Inclusions
Red Jasper	Weak to Picks Up	69-8836	Iron in Microscopic Iron Oxide Inclusions
Mahogany Jasper	Strong	217 SI	Iron in Microscopic Iron Oxide Inclusions
Bloodstone	Weak to Strong	26-521	Iron in Microscopic Iron Oxide Inclusions
Carnelian	Inert	< 0 (diamagnetic)	Iron in Microscopic Iron Oxide Inclusions
Chrysoprase (pale green to medium green)	Inert to Strong	<0-224	Nickel in Microscopic Willemseite Inclusions
Gem Silica (Chrysocolla in Chalcedony)	Inert to Moderate	<0-82	Copper in Microscopic Chrysocolla Inclusions
Blue Chalcedony/Purple Chalcedony	Inert	< 0 (diamagnetic)	Light Scattering
Fire Agate	Picks Up	3975 SI	Iron, light scattering
Chrome Chalcedony (Mtorolite)	Inert to Weak	< 20 SI	Chromium in Microscopic Chrom. Oxide Inclusions
Myrickite (Agatized Cinnabar)	Strong	Varies within the stone	Mercury, Inclusions with Iron and/or Manganese
Onyx	Inert	< 0 (diamagnetic)	Iron in Microscopic Iron Oxide Inclusions
Quartzite			
Aventurine Quartz	Inert to Weak	< 0-27	Chromium, Iron
Rhodochrosite (opaque to transparent)	Picks Up	3515-5269 SI	Manganese
Rhodonite (opaque to transparent)	Picks Up	3610-4288	Manganese, Iron
Richterite (blue opaque)	Moderate	113 SI	Iron, Titanium
Ruby (see Corundum)			
Rutile			
Opaque Metallic Gray	Strong	122 SI	Iron, Titanium
Transparent Red	Strong	327 SI	Iron, Titanium
Synthetic Rutile (transparent colorless)	Inert to Very Weak	< 0 (diamagnetic)	Rare-earth Metals
Sapphire (see Corundum)			
Scapolite (yellow, purple)	Inert	< 0 (diamagnetic)	Color Centers
Selenite (colorless)	Inert	< 0 (diamagnetic)	N/A
Scheelite (transparent yellow)	Inert	< 0 (diamagnetic)	Iron
Seraphinite (Clinocllore)	Moderate	126 SI	Iron
Serpentine			
Opaque Green Bowneite	Drags to Picks Up	363-1519	Iron, Chromium, Nickel
Translucent Green Bowenite	Weak	43 SI	Iron, Chromium, Nickel
Translucent Green Williamite (w/Chromite)	Weak (strong with chromite inclus.)	< 20	Nickel, Iron, Chromium
Shell	Inert	< 0 (diamagnetic)	Organic
Siderite (transparent)	Picks Up	4,924 SI	Iron
Sillimanite			
Green/ Yellow Sillimanite	Weak	35-52 SI	Iron, Chromium

Fibrolite (gray Sillimanite)	Weak	< 20	Charge Transfer?
Silver (native element)	Inert	< 0 (diamagnetic)	Silver
Sinhalite			
Yellow/Brown	Weak to Strong	78 SI	Iron, Charge Transfer involving Iron
Brown	Strong	148-152 SI	Iron
Smithsonite			
Pink Smithsonite	Inert	< 0 (diamagnetic)	Cobalt, Manganese
Blue Smithsonite	Weak	< 20	Copper
Green Smithsonite	Moderate to Strong	No Data	Copper
Yellow Smithsonite	Weak	43 SI	Cadmium, Iron
Sodalite			
Sodalite (translucent to opaque)	Inert to Weak	< 0-48	Color Centers
Hackmanite (transparent)	Inert	< 0 (diamagnetic)	Color Centers
Sphalerite (orange, yellow)	Inert	< 0 (diamagnetic)	Iron-Sulfur Charge Transfer
Sphene (Titanite)			
Yellow/Brown Sphene	Weak to Strong	30-78	Rare-earth Elements, Iron
Green Sphene	Weak	35-52	Chromium, Rare-earth Metals, Iron
Spinel			
Cobalt	Weak to Strong	48-182 SI	Cobalt
Pale Spinel colors	Inert to Weak	< 0-48	Cobalt, Iron, Chromium
Pink, Purple, Red, Blue, Black Spinel (transparent)	Weak to Moderate	48-139	Cobalt, Iron, Chromium
Gahnite (transparent dark green zinc Spinel)	Strong	218 SI	Iron
Hercynite Black Spinel (opaque)	Drags to Picks Up	1263-1328	Iron
Synthetic Spinel			
Synthetic Spinel (blue, pink, most colors)	Inert (blue is weak in rare cases)	< 0 (diamagnetic)	Cobalt, Chromium, Magnanese
Synthetic Red Spinel	Weak	< 20	Chromium, Cobalt
Synthetic Green Spinel (blue-green, neon green)	Inert to Moderate	< 0-122	Manganese, Chromium
Spodumene			
Kunzite (pink, purple, some fading)	Inert	< 0 (diamagnetic)	Manganese
Pale Yellow/Green Spodumene (fades in light)	Inert to Weak	< 0 -56	Manganese, Iron-Iron Charge Transfer
Hiddenite (pale green, permanent color)	Weak	65 SI	Chromium, Iron
Staurolite			
Transparent Staurolite	Picks Up	927-1054	Iron
Opaque Staurolite	Drags	890 SI	Iron
Strontium Titanite (colorless)	Inert	< 0 (diamagnetic)	None
Sugilite			
Opaque Massive Sugilite	Drags to Picks Up	556-950	Manganese, Iron
Transparent Sugilite	Strong	170 SI	Manganese, Iron
Taaffeite (transparent purple)	Strong	135 SI	Iron, Chromium
Tantalite	Picks Up	No Data	Manganese
Titanium (native element)	Weak	No Data	Titanium
Topaz			
Blue, Pink, Sherry, Brown, Green Topaz	Inert	< 0 (diamagnetic)	Color Centers, Chromium

Imperial Topaz	Inert	< 0 (diamagnetic)	Color Centers, Chromium
Tortoise Shell	Inert	< 0 (diamagnetic)	Organic
Tourmaline Group			
Dravite/Uvite			
Brown, Pinkish Brown, Orangey Brown, Yellow	Inert	< 0 (diamagnetic)	Iron-Titanium Charge Transfer
Yellow	Inert	< 0 (diamagnetic)	Iron-Titanium Charge Transfer, Manganese
Dark Green Chrome Dravite	Inert	< 0 (diamagnetic)	Vanadium, Chromium
Pale Green Vanadian Dravite	Inert	< 0 (diamagnetic)	Vanadium, Chromium
Elbaite/Liddicoatite			
Colorless "Achroite"	Inert	< 0 (diamagnetic)	N/A
Verdelite: Green, Grayish Green (Medium to Dark)	Strong to Drags	148-418	Iron, Iron-Titanium Charge Transfer
Green: Pale	Weak to Moderate	43- 260 SI	Iron, Iron-Titanium Charge Transfer
Yellow, Greenish Yellow, Brownish Yellow	Weak to Drags	<20-443	Manganese-Titanium Charge Transfer, Mn., Iron
Paraiba: Blue	Inert-Strong	<0-286	Copper, Manganese
Paraiba: Green	Weak-Drags	17-386	Copper, Manganese
Indicolite: Blue/Greenish Blue (Medium to Dark)	Drags	304-447	Iron, iron-iron charge transfer
Blue: Pale	Strong	55-254	Iron
Purple: Pale Lilac	Moderate	87 SI	Manganese
Rubellite (Red)	Inert to Moderte	< 0-78	Manganese, Color Centers
Pink, Purplish Pink	Inert to Moderate	< 0-156	Manganese, Iron
Reddish Brown, Pinkish Brown, Pinkish Orange	Weak to Drags	<20- 547 SI	Manganese, Iron
Gray (transparent), Purplish Gray Bluish Gray	Drags	469-529	Iron, Mang., Titanium, Iron-Iron Charge Transfer
Schorl			
Black (opaque)	Drags	773-990 SI	Iron, Mang., Titanium, Iron-Iron Charge Transfer
Tanzanite (see Zoisite)			
Triphylite (transparent)	Picks Up	3289 SI	Iron, Manganese
Triplite (transparent)	Picks Up	4,706 SI	Manganese, Iron
Tugtupite	Inert	< 0 (diamagnetic)	Color Centers
Turquoise			
Blue	Weak to Moderate	26-135	Copper
Green	Weak to Strong	35-278	Copper, Iron
Variscite	Inert to Moderate	< 0-117	Chromium, Iron
Vivianite	Picks Up	1766 SI	Iron
Wulfenite (orange)	Inert	< 0 (diamagnetic)	Charge Transfer involving Chromium & Oxygen
Xenotime	Picks Up	No Data	Rare-earth Metals
YAG (see Garnet)			
Zincite (red, yellow)	Inert	< 0 (diamagnetic)	Manganese, Iron
Zircon (any color)	Inert	< 0 (diamagnetic)	Color Centers, Uranium (blue)
Zoisite			
Tanzanite (blue, green, brown)	Inert	< 0 (diamagnetic)	Vanadium, Chromium (green)
Tanzanite (pink)	No Data	No Data	Manganese
Thulite (opaque pink)	Picks Up	3454 SI	Manganese

|

|



|

|

|

|

|

|

|

|

|
