Magnetic Susceptibility Index for Gemstones

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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)			
Almandine (see Garnet)			
Amazonite (see Feldspar)			
Amber (any color)	Inert	< 0 (diamagnetic)	Charge Transfer involving Organic Compounds
Amblygonite-Montebrasite (blue, green)	Inert	< 0 (diamagnetic)	Iron, Manganese
Amethyst (see Quartz)			
Andalusite			
Brownish Green	Inert to Weak	< 0 -26	Iron-Oxygen-Titanium Charge Transfer
Viridine or Mangan-Andalusite (dark green)	Moderate	100 SI	Manganese (Mn3+), Iron
Andradite (see Garnet)			
Anglesite (transparent yellow)	Inert	< 0 (diamagnetic)	Sulfur?
Apatite			
Blue, Grass Green	Inert (Weak in rare cases)	< 0 (diamagnetic)	Neodymium, Mang., Charge Transfer, Color Cent.
Chrome Green	Inert	< 0 (diamagnetic)	Chromium
Yellow, Yellowish Brown	Weak to Strong	< 20 - >120	Neodymium/Praesodymium
Purple	Inert to Weak	0- < 20	Manganese
Aquamarine (see Beryl)			
Astrophyllite	Strong	1146-1328	Iron, Manganese
Axinite			
Ferroaxinite (brown, bluish brown)	Drags	603-654 SI	Iron, Vanadium (blue)
Manganaxinite (yellow)	Drags	345-378 SI	Manganese, possibly Charge Transfer
Manganaxinite (opaque black end member)	Drags	998 SI	Manganese
Magnesioaxinite (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, Neodymium, Praseodymium
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, Oxygen-Iron Charge Trnasfer
Heliodor (yellowish green)	Inert	< 0 (diamagnetic)	Iron, Chromium
Morganite	Inert	< 0 (diamagnetic)	Manganese
Blue Beryl (Maxixe)	Inert	< 0 (diamagnetic)	Color centers
Red Beryl (transparent Bixbite)	Strong	117 SI	Manganese
Pezzottaite (pink, Beryl Group)	Weak	< 20	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)	Inert	< 0 (diamagnetic)	Bismuth
Brazilianite (transparent greenish yellow)	Inert	< 0 (Diamagnetic)	Iron, possibly in Color Centers
Bumblebee "Jasper" (mineral aggregate)	Moderate to Strong	Varies within the stone	Sulfur, Arsenic, Hematite
Bustamite (translucent)	Picks Up	2,995 SI	Manganese
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 (see Spinel)			
Chrysoberyl			
Chrysoberyl	Weak to Moderate	20-127	Iron, Chromium
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 Zirconia (CZ)			
Most CZ colors	Inert to Weak	< 0-39	Various Metals
Pink CZ	Drags	430-807	Erbium, Holmium
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)	Neodymium, Praesodymium
Demantoid (see Garnet)			
Diamond (colorless, fancy colors, black)	Inert	< 0 (diamagnetic)	Color Centers (Nitrogen, Boron)
HTHP Synthetic Diamond (yellow,blue,colorless)	Inert to Picks Up (metal inclsuions)	< 0 to Ferromagnetc	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 NeedleInclusions 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
Dunilite (see Peridot)			
Ekanite (transparent green)	Weak	<20	Iron, (Radioactvie due to Thorium)
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
Chrome Enstatite	Strong	282 SI	Vanadium, Chromium, Iron
Eosphorite	Picks Up	2365 SI	Manganese, Iron
Epidote	Drags	491 SI	Iron
Euclase (pale blue, yellowish green)	Inert	< 0 (diamagnetic)	Iron to Iron Charge Transfer
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			
African Sunstone (with Hematite, African & Indian)	Inert	< 0 (diamagnetic)	Iron (Hematite Inclusions))
Pale Green Oligoclase	Inert	< 0 (diamagnetic)	No Data
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)
Forsterite			
Peridot (green Forsterite)	Drags	417-590	Iron
Near-colorless Forsterite	Weak	52 SI	Iron
Dunilite (brown Forsterite)	Picks up	1435 SI	Iron
Synthetic Forsterite (blue)	Weak	< 20	Chromium
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/Vanadium
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, red)	Weak to Strong	74-339	Iron, Chromium/Vanadium, Manganese
Mali Garnet	Drags	234-1099	Iron
Green Grossular (including Tsavorite & Merelani)	Weak to Strong	20-309	Chromium/Vanadium, Iron
Rosolite (pink)	Strong	147 SI	Manganese
Near-Colorless and Leuco Grossular	Weak to Moderate	15-127	Chromium/Vanadium, Manganese, Iron
Pyrope Garnet			
Standard Pyrope Garnet	Picks Up	1163-1971	Iron, Chromium/Vanadium
Rhodolite Garnet	Picks Up	1007-1890	Iron, ChromiumVanadium
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	Drags	909-998	Chromium/Vanadium
Synthetic Garnet			
GGG (Gadolinium Gallium Garnet) Any Color	Picks Up	6219-7404	Gadolinium (colorless) and Various dopants
SGG (Samarium Gallium Garnet) Yellow	Strong	291 SI	Samarium
YAG (Yttrium Aluminum Garnet) Yellow	Inert to Weak	< 0-35	Various Dopants
YAG (Yttrium Aluminum Garnet) Green	Inert to Strong	< 0-339	Chromium, Rare Earths
YAG (Yttrium Aluminum Garnet) Pink	Strong to Drags (rarely Picks Up)	356-391 (rare 5433)	Manganese (rarely Erbium)
YAG (Yttrium Aluminum Garnet) Violet	Weak to Moderate	30-126	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
Pink Glass	Drags	700 SI	Erbium, Holmium
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
Hessonite (see Garnet)			
Herderite (transparent light orange)	Inert	<0 (diamagnetic)	No Data, possibly charge transfer or color centers
Howlite (white or dyed)	Inert	< 0 (diamagnetic)	None or Man-made Dyes
Idocrase/Vesuvianite (green)	Strong	217-233	Iron

Indicolite (see Tourmaline)			
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
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			
Blue Kornerupine	Weak	< 20	Vanadium
Green Kornerupine	Moderate to Strong	100-282	Vanadium, Iron
Kunzite (see Spodumene)			
Kyanite			
Blue Kyanite	Inert, rarely Weak	< 0 - < 20	Iron- Titanium Charge Transfer
Blue-green Chrome Kyanite	Inert to Weak	<0 -30	Chromium, 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
Magnesite (transparent gray)	Drags	985 SI	Iron
Magnetite (see Spinel)			
Malachite	Drags	477 SI	Copper
Maw Sit Sit	Moderate to Strong	139-230	Chromium, Iron
Moissanite (**man-made**, colorless, pale colors)	Inert	< 0 (diamagnetic)	Color Centers involving Nitrogen, Boron, Aluminum
Moldavite (natural glass)	Weak	69 SI	Iron
Moonstone (see Feldspar)			
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
Nuummite (Anthophyllite & Gedrite)	Drags	1094 SI	Light Diffraction in black matrix, Iron
Orpiment (yellow)	Inert	< 0 (diamagnetic)	Sulfur (also contains Arsenic)

Obsidian (natural glass)			
Mahogany Obisidan	Picks Up	1953 SI	Iron
Opaque Obisidan	Drags	304 -750	Iron
Translucent Obisidan	Strong	247 SI	Iron
Transparent Obisidan (black)	Weak to Moderate	74 -95	Iron
Transparent Obisidan (near-colorless)	Weak	22 SI	Iron
Onyx (see Quartz)			
Opal			
Prescious 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 (Yellow, Orange, Red)	Inert	<0 (diamagnetic)	Iron in Microscopic Iron Oxide Inclusions
Fire Opal from Brazil, Oregon (Yellow, Orange)	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	No Data	Light Diffraction, Iron in the Host Matrix
Pargasite (see Actinolite)			
Parisite	Drags	345 SI	Cerium, Neodymium, Praseodymium
Pearl	Inert	< 0 (diamagnetic)	Interference Colors, Charge Transfer
Pectolite (blue Larimar)	Inert	< 0 (diamagnetic)	Copper
Peridot (see Forsterite)			
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
Pyrope (see Garnet)			
Pyroxymangite (transluc. dimorph of Rhodonite)	Picks Up	No Data	Manganese
Pyrrhotite	Picks Up	Ferromagnetic	Iron
Quartz (macrocrystalline)			
Amethyst	Inert	< 0 (diamagnetic)	Charge Transfer & Color Centers 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
Smoky Quartz	Inert	< 0 (diamagnetic)	Color Centers involving Aluminum
Quartz with Inclusions			
Rutile, Hematite & Most Other Inclusions	Inert	< 0 (diamagnetic)	Varies with type of Inclusions
Tourmalinated Quartz (black or blue Tourmaline)	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 Inclus.)	Weak	56 SI	Copper, Manganese In Micr. Incl. of Paraiba Tourm.
Rose Quartz	Inert	< 0 (diamagnetic)	Microscopic Inclusions, Color Centers, Charge Tran.
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 (Fe3+), Limonite macro Inclusions
Hawk's Eye	Weak	< 20	Iron oxide (Fe2+), Limonite 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	Inert	< 0 (diamagnetic)	Light Scattering
Purple Chalcedony	Inert	< 0 (diamagnetic)	Light Scattering, Microscopic Sugilite Inclusions
Fire Agate	Picks Up	3975 SI	Iron, Light Diffraction
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
Pietersite	Inert to Strong	< 0-305 (varies with iron)	Iron Oxide, Crocidolite macro Inclusions
Quartzite			
Aventurine Quartz (green)	Inert to Weak	< 0-27	Chromium in Fuchsite Mica inclusions
Rhodochrosite (opaque to transparent)	Picks Up	3515-5269 SI	Manganese
Rhodolite (see Garnet)			
Rhodonite (opaque to transparent)	Picks Up	3610-4288	Manganese, Iron
Richterite (blue opaque)	Moderate	113 SI	Iron, Titanium
Rubellite (see Tourmaline)			
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)	None
Sapphire (see Corundum)			
Sapphirine	Weak to Moderate	73-95 SI	Iron, Charge Transfer involving Iron
Scapolite (yellow, purple)	Inert	< 0 (diamagnetic)	Color Centers, Charge Transfer
Selenite (colorless)	Inert	< 0 (diamagnetic)	N/A
Scheelite (transparent yellow)	Inert	< 0 (diamagnetic)	Neodymium
Seraphinite (Clinochlore)	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 Williamiste (w/Chromite)	Weak (strong with chromite inclus.)	< 20	Nickel, Iron, Chromium
Shattuckite	Strong	256-286	Copper
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	No Data, possibly 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 to Weak	< 0 -74	Manganese, Cobalt
Blue Smithsonite	Weak	26 SI	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
Spessartine (see Garnet)			
Sphalerite (orange, yellow)	Inert	< 0 (diamagnetic)	Iron-Sulfur Charge Transfer
Sphene (Titanite)			
Yellow/Brown Sphene	Weak to Strong	30-78	Neodymium, Iron
Green Sphene	Weak	35-52	Chromium, Neodymium, Iron
Spinel			
Blue (light blue to dark blue)	Weak to Strong (Drag is rare)	35-200 (360 rare)	Cobalt, Iron
Red	Weak to Strong	17-139	Chromium, Iron
Pink (pale to vivid pink)	Inert to Strong	<0-165	Chromium, Iron
Purple	Weak	22-56	Chromium, Cobalt, Iron
Gray (bluish, pinkish)	Weak	35-61	Primarily Iron
Orange, Pinkish Orange	Inert-Weak	< 0-<20	Chromium, Iron
Green (bluish, grayish)	Weak	42-48	Iron, Iron-Iron Charge Transfer
Near-colorless (pinkish, grayish)	Inert to Weak	<0-17	None
Gahnite (transparent dark green Zinc Spinel)	Strong	218 SI	Iron-Iron Charge Transfer
Hercynite (opaque black Iron Spinel)	Drags to Picks Up	1263-1328	Iron
Magnetite (opaque black Spinel)	Picks Up	Ferrimagnetic	Iron
Chromite (opaque black iron-chromium Spinel)	Drags	No Data	Iron, Chromium
Synthetic Spinel			
Synthetic Blue Spinel (flame-fusion)	Inert (can be weak in rare cases)	< 0 (diamagnetic)	Cobalt, (Manganese in rare cases)
Synthetic Blue Spinel (flux-grown)	Weak	< 20	Cobalt
Synthetic Pink to Red Spinel (flux-grown)	Inert to Weak	<0- < 20	Chromium
Synthetic Yellowish Green Spinel (flame fusion)	Weak to Moderate	39-122	Manganese

Synthetic Green Spinel (flame fusion)	Inert	< 0 (diamagnetic)	Cobalt, Manganese
Spodumene			
Kunzite (pink, purple)	Inert	< 0 (diamagnetic)	Manganese, Color Centers
Pale Yellow/Green Spodumene	Inert to Weak	< 0 -56	Manganese, Iron-Iron Charge Transfer, Color Cntrs
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 Titanate (colorless or yellow)	Inert	< 0 (diamagnetic)	None or Manganese (yellow)
Sunstone (see Feldspar)			
Sugilite			
Opaque Massive Sugilite	Drags to Picks Up	556-950	Manganese, Iron
Translucent 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, Yellow	Inert	< 0 (diamagnetic)	Color Centers, Chromium
Imperial Topaz (reddish orange)	Inert	< 0 (diamagnetic)	Color Centers, Chromium
Tortoise Shell	Inert	< 0 (diamagnetic)	Organic
Tourmaline Group			
Dravite			
Brown, Pink-Brown, Orange-Brown, Yellow-Brown	Inert	< 0 (diamagnetic)	Iron-Titanium Charge Transfer
Chrome Tourmaline (Dark Green to Pale Green)	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	<20-512	Manganese-Titanium Charge Transfer, Mn., Iron
Paraiba: Blue	Inert-Strong	<0-286	Copper, Manganese
Paraiba: Green	Weak-Drag	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-Strong	87 -213 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
Rossmanite			
Pinkish purple (translucent)	Weak	< 20	Manganese
Schorl			
Black (opaque)	Drags	773-990 SI	Iron, Mang., Titanium, Iron-Iron Charge Transfer

Uvite			
Brownish Red	Strong	218-243 SI	Iron
Yellowish Green	Inert	< 0 (diamagnetic)	Chromium, Vanadium
Tanzanite (see Zoisite)			
Triphylite (transparent)	Picks Up	3289 SI	Iron, Manganese
Triplite (transparent orange)	Picks Up	4,706-4,982 SI	Manganese
Tsavorite (see Garnet)			
Tugtupite	Inert	< 0 (diamagnetic)	Color Centers
Turquoise			
Blue	Weak to Moderate	26-135	Copper
Green	Weak to Strong	35-278	Copper, Iron
Variscite			
Variscite (green)	Inert to Moderate	< 0-117	Chromium, Iron
Metavariscite (chrome green)	Inert	< 0 (diamagnetic)	Chromium
Vesuvianite (see Idocrase)			
Viridine (see Andalusite)			
Vivianite	Picks Up	1766 SI	Iron
Wulfenite (orange)	Inert	< 0 (diamagnetic)	Charge Transfer involving Chromium & Oxygen
Xenotime	Picks Up	No Data	Erbuim, Holmium
YAG (see Garnet)			
Zincite (red, yellow)	Inert	< 0 (diamagnetic)	Manganese, Iron
Zircon			
Zircon (yellow, brown, orange, pink, red)	Inert	< 0 (diamagnetic)	Color Centers, Uranium
Zircon (blue)	Inert	< 0 (diamagnetic)	Uranium
Zircon (green, metamict)	Inert (rarely weak)	< 0 -< 20	Uranium
Zoisite			
Tanzanite (blue, purple)	Inert	< 0 (diamagnetic)	Vanadium (V4+)
Zoisite (brown, yellow)	Inert	< 0 (diamagnetic)	Vanadium (V3+)
Zoisite (green)	Inert	< 0 (diamagnetic)	Chromium/Vanadium
Zoisite (pink, transparent Thulite)	No Data	No Data	Manganese
Thulite (opaque pink Zoisite)	Picks Up	3454 SI	Manganese