For Further Reading

*Gems & Gemology (G&G)*, GIA's professional journal, provides in-depth feature articles on the latest gemological research, from gem treatments, synthetics, and the evaluation of gem quality to developments in gem production, market sources, and more.

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**Assignment 1: Introduction**

*Gems & Gemology: [https://www.gia.edu/gems-gemology](https://www.gia.edu/gems-gemology)*

News and Articles: [https://www.gia.edu/gia-news-research](https://www.gia.edu/gia-news-research)

**GIA Gem Project**

Dr. Edward Gübelin's comprehensive collection was acquired by GIA in 2005. The Gübelin collection consists of approximately 2,800 gems representing 225 different minerals. It now forms part of the GIA Gem Collection, where it is being used for research, education, and display. Since 2007, GIA has undertaken a project to characterize gemstones from the Gübelin collection. This project has two main goals: to systematically document the stones using a range of techniques, and to make the results available on the GIA website as a valuable resource for students, gemologists, researchers, and anyone interested in gem materials. Each entry includes geographic locality information, a summary of standard gemological properties, a brief description of the internal or external features that can be seen with standard magnification, and infrared, visible, Raman, and photoluminescence spectra where relevant.

Please see the index page at [https://www.gia.edu/gia-gem-database](https://www.gia.edu/gia-gem-database)

**Major Entries**

Beryl: [https://www.gia.edu/gia-gem-project-beryl](https://www.gia.edu/gia-gem-project-beryl)

Corundum: [https://www.gia.edu/gia-gem-corundum](https://www.gia.edu/gia-gem-corundum)

Garnet: [https://www.gia.edu/gia-gem-project-garnet](https://www.gia.edu/gia-gem-project-garnet)

Spinel: [https://www.gia.edu/gia-gem-project-spinel](https://www.gia.edu/gia-gem-project-spinel)

Tourmaline: [https://www.gia.edu/gia-gem-project-tourmaline](https://www.gia.edu/gia-gem-project-tourmaline)

Zircon: [https://www.gia.edu/gia-gem-project-zircon](https://www.gia.edu/gia-gem-project-zircon)

**Various gems**

Amblygonite–Axinite: [https://www.gia.edu/gia-gem-project-various-gems-a](https://www.gia.edu/gia-gem-project-various-gems-a)

Barite–Cuprite: [https://www.gia.edu/gia-gem-project-various-gems-b-c](https://www.gia.edu/gia-gem-project-various-gems-b-c)

Danburite–Humite: [https://www.gia.edu/gia-gem-project-various-gems-d-h](https://www.gia.edu/gia-gem-project-various-gems-d-h)

Kornerupine–Natrolite: [https://www.gia.edu/gia-gem-project-various-gems-k-n](https://www.gia.edu/gia-gem-project-various-gems-k-n)

Olivine (peridot)–Rutile: [https://www.gia.edu/gia-gem-project-various-gems-o-r](https://www.gia.edu/gia-gem-project-various-gems-o-r)

Sapphirine–Stibiotantalite: [https://www.gia.edu/gia-gem-project-various-gems-s](https://www.gia.edu/gia-gem-project-various-gems-s)

Taaffeite–Zoisite: [https://www.gia.edu/gia-gem-project-various-gems-t-z](https://www.gia.edu/gia-gem-project-various-gems-t-z)
Assignment 2: General Observation

Doubling

https://www.gia.edu/gems-gemology/winter-1984-calcite-hurlbut

Phenomena

https://www.gia.edu/gia-news-research/optical-effects-phenomenal-cabochons


https://www.gia.edu/gems-gemology/winter-1982-alexandrite-effect-gubelin

Assembled Stones

Anjomani N. (2016) Lab Notes: Synthetic Sapphire and Synthetic Spinel Doublets. Gems & Gemology, Vol. 52, No. 4
https://www.gia.edu/gems-gemology/winter-2016-labnotes-synthetic-sapphire-synthetic-spinel-doublets

https://www.gia.edu/gems-gemology/FA13-LN-imitation-moonstone-assemblage

https://www.gia.edu/gems-gemology/spring-2012-gem-news-international

https://www.gia.edu/gems-gemology/spring-2011-gem-news-international

https://www.gia.edu/gems-gemology/fall-2007-gem-news-international

https://www.gia.edu/gems-gemology/summer-2001-imitating-asterism-mcclure

https://www.gia.edu/gems-gemology/spring-2001-lab-notes

https://www.gia.edu/gems-gemology/fall-1995-lab-notes

Assignment 3: Refraction and the Refractometer


Assignment 4: Polariscope Testing

https://www.gia.edu/gems-gemology/fall-1986-amethyst-twinning-crownsinghield
Assignment 5: Pleochroism and the Dichroscope

https://www.gia.edu/gems-gemology/fall-2014-introduction-pleochroism-faceted-gems

Assignment 6: Magnification

https://www.gia.edu/gems-gemology/winter-2016-microworld-ferropericlase-inclusion-diamond

https://www.gia.edu/gems-gemology/fall-2016-microworld-etch-marks-negative-crystals-tubes-spinel-madagascar

https://www.gia.edu/gems-gemology/fall-2016-microworld-tourmaline-termination

https://www.gia.edu/gems-gemology/fall-2016-gemnews-large-aqueous-primary-fluid-inclusion-amethyst

https://www.gia.edu/gems-gemology/fall-2016-microworld-mobile-fluorite-quartz

https://www.gia.edu/gems-gemology/fall-2016-microworld-unusual-growth-zoning-beryl

https://www.gia.edu/gems-gemology/spring-2016-microworld-fantastic-display-phase-changes-sapphires-fluid-inclusion

https://www.gia.edu/gems-gemology/summer-2015-microworld-introduction-gems

https://www.gia.edu/gems-gemology/micro-world-gallery


The Hidden Beauty of Gemstones (2013) GIA Research & News
https://www.gia.edu/photomicrography

https://www.gia.edu/gems-gemology/spring-2009-tourmalines-mozambique-koivula


For Further Reading

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**Assignment 7: Selective Absorption and the Spectroscope**

https://www.gia.edu/gems-gemology/summer-1982-diamonds-coloration-scarratt


https://www.gia.edu/summer-1957-a4-spectroscopy-gem-testing-crowningshield

**Assignment 8: Fluorescence and Phosphorescence**


https://www.gia.edu/gems-gemology/summer-2013-luo-fluorescence-optical-defects

https://www.gia.edu/gems-gemology/winter-1997-fluorescence-diamonds-moses

**Assignment 9: Additional Tests**

https://www.gia.edu/gems-gemology/winter-2012-hpht-diamond-feral

https://www.gia.edu/gems-gemology/summer-1983-diamond-thermal-hoover
Assignment 10: Separation and Identification

https://www.gia.edu/gems-gemology/summer-1994-emeralds-madagascar-schwarz

https://www.gia.edu/gems-gemology/summer-1993-synthetic-spinel-russia-muhlemaster

https://www.gia.edu/gems-gemology/spring-1982-jade-enigma-hobbs


Assignment 11: Separating Natural Gems from Synthetics and Imitations

Synthetic Diamonds (General)

https://www.gia.edu/gems-gemology/spring-2016-photoluminescence-spectroscopy-diamond-applications-gemology

Dieck C. et al. (2016) Lab Notes: Analysis of Yellow Diamond Melee for Color Treatment and Synthetics. Gems & Gemology, Vol. 52, No. 1
https://www.gia.edu/gems-gemology/spring-2016-labnotes-analysis-yellow-diamond-melee-color-treatment-synthetics

https://www.gia.edu/identifying-lab-grown-diamonds

Wang W. et al. (2015) Lab Notes: Screening of Small Yellow Diamond Melee for Treatment and Synthetics. Gems & Gemology, Vol. 50, No. 4
https://www.gia.edu/gems-gemology/winter-2014-labnotes-small-yellow-diamond-melee

https://www.gia.edu/gems-gemology/winter-2010-synthetic-diamonds-renfro


https://www.gia.edu/gems-gemology/winter-2004-characteristics-hppt-grown-synthetic-diamonds-shigley


https://www.gia.edu/gems-gemology/summer-1989-diamond-thin-films-fritsch
CVD Synthetic Diamonds


https://www.gia.edu/gems-gemology/fall-2011-cvd-synthetic-diamond-willems

https://www.gia.edu/gems-gemology/spring-2010-synthetic-diamond-khan

https://www.gia.edu/gems-gemology/spring-2010-pink-cvd-diamonds-wang

https://www.gia.edu/ongoing-research/cvd-grown-pink-diamonds


**HPHT Synthetic Diamonds**


https://www.gia.edu/gems-gemology/winter-2016-labnotes-blue-HPHT-synthetic-diamond-over-10-carats

https://www.gia.edu/gems-gemology/summer-2016-labnotes-yellow-synthetic-diamond-nickel-related-green-fluorescence

https://www.gia.edu/gems-gemology/spring-2016-labnotes-largest-blue-HPHT-synthetic-diamond

https://www.gia.edu/gems-gemology/spring-2016-gemnews-large-colorless-hpht-synthetic-gem-diamonds-china

Poon P.Y. et al. (2015) Large HPHT-Grown Synthetic Diamonds Examined in GIA’s Hong Kong Laboratory. GIA Research & News


https://www.gia.edu/gems-gemology/spring-2014-ulrika-hpht-synthetic-diamonds

https://www.gia.edu/gems-gemology/winter-2012-hpht-diamond-feral

https://www.gia.edu/gems-gemology/fall-2009-diamonds-hpht-treated-dobrinets


Shigley J.E. et al. (2002) Gemesis Laboratory-Created Diamonds. Gems & Gemology, Vol. 38, No. 4
https://www.gia.edu/gems-gemology/winter-2002-gemesis-laboratory-created-diamonds-shigley

https://www.gia.edu/gems-gemology/spring-1997-synthetic-diamond-properties-shigley


https://www.gia.edu/gems-gemology/winter-1993-russia-synthetic-diamond-shigley

https://www.gia.edu/gems-gemology/fall-1993-synthetic-diamond-shigley


https://www.gia.edu/gems-gemology/winter-1987-debeers-synthetic-diamond-shigley
https://www.gia.edu/gems-gemology/winter-1986-synthetic-diamond-shigley

https://www.gia.edu/gems-gemology/fall-1984-synthetic-diamond-koivula

https://www.gia.edu/gems-gemology/fall-1984-synthetic-diamonds-rossman

Synthetic Corundum

https://www.gia.edu/gia-news-research/synthetic-ruby-overgrowth-corundum-analysis

https://www.gia.edu/gia-news-research-Sapphire-Series-Introduction-to-Sapphire-and-Synthetic-Sapphire

https://www.gia.edu/gia-news-research-Sapphire-Series-Treated-Synthetics

https://www.gia.edu/gems-gemology/fall-1997-hydrotherma-synthetic-sapphires-thomas

https://www.gia.edu/gems-gemology/summer-1994-douros-synthetic-ruby

https://www.gia.edu/gems-gemology/winter-1988-ruby-inamori-koivula


https://www.gia.edu/gems-gemology/fall-1983-synthetic-ruby-kane

https://www.gia.edu/gems-gemology/fall-1982-synthetic-sapphire-kane

https://www.gia.edu/gems-gemology/fall-1982-synthetic-ruby-gubelin

Synthetic Beryl

https://www.gia.edu/gems-gemology/winter-2016-synthetic-emeralds-richard-nacken-1920s
FOR FURTHER READING

https://www gia.edu/gems-gemology/winter-2007-gem-news-international

https://www gia.edu/gems-gemology/spring-1996-hydrothermal-synthetic-emerald-koivula

https://www gia.edu/gems-gemology/fall-1987-lennix-synthetic-emerald-graziani

https://www gia.edu/gems-gemology/fall-1985-synthetic-emerald-australia-kane

https://www gia.edu/gems-gemology/summer-1985-russia-synthetic-emerald-koivula

https://www gia.edu/gems-gemology/fall-1984-synthetics-emerald-stockton

Synthetic Quartz

https://www gia.edu/gems-gemology/summer-1999-russian-synthetic-ametrine-balitsky

https://www gia.edu/gems-gemology/spring-1998-russian-synthetic-pink-quartz-balitsky

https://www gia.edu/gems-gemology/fall-1986-amethyst-twinning-crowningshield

Synthetic Opal

https://www gia.edu/gems-gemology/spring-2012-gem-news-international

https://www gia.edu/gems-gemology/fall-2008-synthetic-fire-opal-choudhary

https://www gia.edu/gems-gemology/fall-1987-synthetic-opal-kyocera-schmetzer

Other

https://www gia.edu/gems-gemology/winter-2010-synthetic-diamonds-renfro

https://www gia.edu/gems-gemology/summer-1997-gem-news-international

https://www gia.edu/gems-gemology/fall-1987-malachite-russia-balitsky

https://www gia.edu/gems-gemology/fall-1987-alexandrite-inamori-created-kane

https://www gia.edu/gems-gemology/spring-1987-synthetic-jadeite-nassau

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Assignment 12: Detecting Gem Treatments

General Treatment Articles

https://www.gia.edu/gems-gemology/fall-2010-detection-disclosure-heating-mcclure

https://www.gia.edu/gems-gemology/spring-2008-history-of-diamond-treatments-overton


https://www.gia.edu/gems-gemology/spring-1990-gemstone-enhancement-kammerling

Heat Treatment

https://www.gia.edu/gia-news-research-low-temperature-heat-treatment-mozambique-ruby


https://www.gia.edu/gems-gemology/FA13-koivula-corundum-heat-treatment

https://www.gia.edu/ongoing-research/distinguishing-heated-unheated-spinel

https://www.gia.edu/gems-gemology/summer-2007-gem-news-international

https://www.gia.edu/gems-gemology/winter-1993-montana-sapphires-emmett

Diffusion Treatment


https://www.gia.edu/gems-gemology/spring-2002-gem-news-international


https://www.gia.edu/gems-gemology/summer-1990-diffusion-treated-sapphire-kane
Other Corundum Treatments and Treatment Combinations


https://www.gia.edu/gems-gemology/winter-1984-ruby-glass-kane

https://www.gia.edu/gems-gemology/winter-1983-inclusions-koivula

HPHT Treatment of Diamond


https://www.gia.edu/gems-gemology/fall-2000-ge-pol-diamonds-smith


https://www.gia.edu/gems-gemology/winter-1999-general-electric-enhanced-diamonds-schmetzer

Clarity Enhancement

https://www.gia.edu/gems-gemology/spring-2016-labnotes-hydrophane-opal-treatment

https://www.gia.edu/gems-gemology/FA13-LN-green-glass-filled-sapphire

https://www.gia.edu/ongoing-research/lead-glass-filled-star-rubies-reportedly-from-madagascar


https://www.gia.edu/gems-gemology/summer-2000-filling-material-diamonds-oved-shigley

https://www.gia.edu/gems-gemology/summer-2000-lasering-technique-diamond-mcclure


https://www.gia.edu/gems-gemology/summer-1989-diamond-filling-koivula

**Irradiation**


https://www.gia.edu/gems-gemology/winter-2014-labnotes-irradiated-yellow-diamond

https://www.gia.edu/gems-gemology/fall-2014-labnotes-irradiated-cvd-synthetic-diamond

https://www.gia.edu/gems-gemology/spring-2013-labnotes-green-radioactive-salt

https://www.gia.edu/gems-gemology/summer-1989-color-treated-diamond-fritsch

https://www.gia.edu/gems-gemology/spring-1985-topaz-color-nassau

https://www.gia.edu/gems-gemology/summer-1982-irradiated-spodumene-rossman

https://www.gia.edu/gems-gemology/winter-1981-radioactivity-topaz-crowningshield

**Coating**

https://www.gia.edu/gia-news-research-titanium-coated-tanzanite-cooper

https://www.gia.edu/gems-gemology/gemological-characteristics-coated-jadeite-jade

https://www.gia.edu/gems-gemology/summer-2008-coated-tanzanite-mcclure


Dyeing


Quench-Crackling


Bleaching and Polymer Impregnation


Sugar Treatment


General


For Further Reading

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Assignment 13: Separating Red, Pink, and Purple Gems

**Pink-to-Red Diamond**

Eaton-Magaña S. (2016) Lab Notes: Treated Pink Type IIa Diamond Colored by Red Luminescence. _Gems & Gemology_, Vol. 52, No. 3
https://www.gia.edu/gems-gemology/fall-2016-labnotes-treated-pink-type-IIa-diamond-colored-red-luminescence


https://www.gia.edu/gems-gemology/FA13-LN-pinkish-brown-CVD-synthetic

Moe K.S. (2013) Lab Notes: Large HPHT-Treated Fancy Pink Diamond. _Gems & Gemology_, Vol. 49, No. 1
https://www.gia.edu/gems-gemology/spring-2013-labnotes-hpht-fancy-pink

https://www.gia.edu/gems-gemology/spring-2010-pink-cvd-diamonds-wang


Wang W. et al. (2005) Treated-Color Pink-To-Red Diamonds from Lucent Diamonds Inc. _Gems & Gemology_, Vol. 41, No. 1

https://www.gia.edu/gems-gemology/summer-2002-grading-natural-pink-diamonds-king

**Ruby and Pink-to-Red Corundum**

https://www.gia.edu/gems-gemology/fall-2016-gemnews-preliminary-study-rubies-reportedly-pokot-kenya

https://www.gia.edu/gems-gemology/spring-2016-gemnews-ruby-sapphire-muling-china


Series of Articles on Rubies from Mozambique (2014) GIA Research & News
https://www.gia.edu/gia-news-research-mozambique-montepuez-rubies

https://www.gia.edu/gems-gemology/fall-2011-ruby-sapphire-khol

https://www.gia.edu/gems-gemology/fall-2009-gem-news-international

https://www.gia.edu/gia-news-research-nr32309

https://www.gia.edu/gems-gemology/winter-2008-rubies-sapphires-tanzania-schwarz

https://www.gia.edu/gems-gemology/summer-2008-gem-news-international

https://www.gia.edu/gems-gemology/fall-2007-gem-news-international


https://www.gia.edu/gems-gemology/spring-1995-ruby-mong-hsu-peretti


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**Treated Red Corundum**


**Pink-to-Red Spinel**


https://www.gia.edu/gems-gemology/spring-2009-lab-notes

Saeseaw S. et al. (2009) Distinguishing Heated Spinels from Unheated Natural Spinels and from Synthetic Spinels. GIA Research & News  
https://www.gia.edu/ongoing-research/distinguishing-heated-unheated-spinel

https://www.gia.edu/gems-gemology/spring-2004-gem-news-international


**Garnet**

https://www.gia.edu/gems-gemology/fall-2016-gemnews-purple-pyrope-almandine-garnet-mozambique


Pink-to-Red Tourmaline
https://www.gia.edu/gems-gemology/fall-2009-gem-news-international

https://www.gia.edu/gems-gemology/fall-2009-gem-news-international

https://www.gia.edu/gems-gemology/spring-2002-liddicoatite-tourmaline-madagascar

Pink-to-Red Topaz
https://www.gia.edu/gems-gemology/fall-1986-pink-topaz-gubelin

Pink-to-Red Beryl
https://www.gia.edu/gems-gemology/summer-2012-gem-news-international


https://www.gia.edu/gems-gemology/spring-2003-gem-news-international

https://www.gia.edu/gems-gemology/fall-2002-gem-news-international

https://www.gia.edu/gems-gemology/spring-1989-beryl-brazil-kampf

https://www.gia.edu/gems-gemology/winter-1984-beryl-utah-shigley

Purple Quartz


https://www.gia.edu/gems-gemology/spring-2009-gem-news-international

https://www.gia.edu/gems-gemology/spring-2009-anahi-ametrine-mine

https://www.gia.edu/gems-gemology/fall-2004-amethyst-four-peaks-arizona-lowell
https://www.gia.edu/gems-gemology/fall-1989-synthetic-quartz-koivula

**Kunzite Spodumene**

https://www.gia.edu/gems-gemology/summer-2010-gem-news-international

https://www.gia.edu/gems-gemology/winter-2008-gem-news-international

**Oregon Sunstone**


**Red Feldspar (Andesine Controversy)**

https://www.gia.edu/gems-gemology/summer-2011-feldspar-shigatse-tibet-abduriyim


https://www.gia.edu/ongoing-research/special-report-on-red-felspar

https://www.gia.edu/gems-gemology/winter-2010-gem-news-international

https://www.gia.edu/gia-news-research-nr33009A

https://www.gia.edu/gems-gemology/winter-2008-gem-news-international

https://www.gia.edu/gems-gemology/winter-2008-gem-news-international

https://www.gia.edu/gems-gemology/summer-2008-gem-news-international

**Pink-to-Red Opal**

https://www.gia.edu/gems-gemology/winter-2011-hydrophane-opal-renfro
Rhodochrosite

https://www.gia.edu/gems-gemology/fall-2011-gem-news-international

https://www.gia.edu/gems-gemology/spring-2009-gem-news-international

https://www.gia.edu/gems-gemology/summer-1997-rhodochrosite-colorado-knox

Sugilite

https://www.gia.edu/gems-gemology/summer-1987-sugilite-wessels-shigley

Assignment 14: Separating Blue and Violet Gems

Blue Diamond

https://www.gia.edu/gems-gemology/winter-2016-labnotes-blue-HPHT-synthetic-diamond-over-10-carats

https://www.gia.edu/gems-gemology/winter-2016-labnotes-largest-blue-hpht-synthetic-diamond


https://www.gia.edu/gems-gemology/winter-2014-blue-moon-diamond

https://www.gia.edu/gems-gemology/winter-2008-wittelsbach-blue-droschel

King J.M. et al. (1998) Characterizing Natural-Color Type IIB Blue Diamonds. Gems & Gemology, Vol. 34, No. 4
https://www.gia.edu/gems-gemology/winter-1998-blue-diamonds-king

Blue-to-Violet Sapphire

https://www.gia.edu/gems-gemology/summer-2017-inclusions-sapphire

Sapphire Chart Article: Suggested Reading on Sapphires and Their Inclusions (2017) Gems & Gemology, Vol. 53, No. 2

https://www.gia.edu/gia-news-research/sapphire-chanthaburi-thailand-gemological-characteristics

Soonthornantikul W. et al. (2017) An In-Depth Gemological Study of Blue Sapphires from the Baw Mar Mine (Mogok, Myanmar). Research News
https://www.gia.edu/gia-news-research/blue-sapphires-baw-mar-mine-mogok-myanmar


Treated Synthetic Sapphire


Blue-to-Violet Spinel


Copper-Bearing and Blue Tourmaline


Blue Beryl


Iolite

Lapis Lazuli


Kyanite

https://www.gia.edu/gems-gemology/winter-2004-gem-news-international

**Benitoite**

https://www.gia.edu/gems-gemology/fall-1997-benitoite-california-laurs

**Turquoise**

https://www.gia.edu/gems-gemology/fall-2012-turquoise-chen

https://www.gia.edu/gems-gemology/summer-2010-turquoise-composite-choudhary

https://www.gia.edu/gems-gemology/summer-2008-gem-news-international


https://www.gia.edu/gems-gemology/spring-1986-china-turquoise-fuquan

https://www.gia.edu/gems-gemology/fall-1983-turquoise-spectroscopy-lind

**Blue Opal**

https://www.gia.edu/gems-gemology/winter-2003-gem-news-international

**Assignment 15: Separating Green Gems**

**Green Diamond**


https://www.gia.edu/gems-gemology/spring-2013-labnotes-green-radioactive-salt

https://www.gia.edu/gems-gemology/fall-1988-green-diamonds-fritsch
Emerald


https://www.gia.edu/gems-gemology/winter-2016-inclusions-natural-synthetic-treated-emerald

https://www.gia.edu/gems-gemology/fall-2015-colombian-trapiche-emeralds-recent-advances-understanding-formation

https://www.gia.edu/gems-gemology/summer-2014-saeseaw-three-phase-inclusions-emerald

https://www.gia.edu/gems-gemology/spring-2012-emeralds-brazil-zwaan

https://www.gia.edu/gems-gemology/spring-2011-gem-news-international

https://www.gia.edu/gems-gemology/winter-2010-gem-news-international

https://www.gia.edu/gems-gemology/spring-2008-gem-news-international

https://www.gia.edu/gems-gemology/spring-2005-gem-news-international

https://www.gia.edu/gems-gemology/summer-1997-sandawana-mines-emerald-zwaan


https://www.gia.edu/gems-gemology/fall-1989-brazil-emeralds-epstein

FOR FURTHER READING
https://www.gia.edu/gems-gemology/summer-1986-colombia-emeralds-ringsrud

https://www.gia.edu/gems-gemology/spring-1984-emerald-cassedanne

Beryl
https://www.gia.edu/gems-gemology/spring-1993-finland-beryl-lahti

Jadeite
https://www.gia.edu/gems-gemology/gemological-characteristics-coated-jadeite-jade

https://www.gia.edu/ongoing-research/the-jadeite-omphacite-nomenclature-question

https://www.gia.edu/gems-gemology/spring-2000-burmese-jade-hughes


https://www.gia.edu/gems-gemology/spring-1982-jade-enigma-hobbs

Nephrite

https://www.gia.edu/gems-gemology/fall-2014-nephrite-jade-guangxi-province-china

https://www.gia.edu/gems-gemology/summer-2013-adamo-nephrite-italy

Tourmaline

Peridot
https://www.gia.edu/gems-gemology/fall-2016-peridot-central-highlands-vietnam-properties-origin-formation

https://www.gia.edu/gems-gemology/fall-2011-peridot-meteorite-shen

https://www.gia.edu/gems-gemology/summer-2009-peridot-sardinia-italy-adamo
FOR FURTHER READING


https://www.gia.edu/gems-gemology/spring-1986-china-peridot-koivula

https://www.gia.edu/gems-gemology/summer-1983-peridot-tanzania-stockton


**Grossular Garnet (Including Tsavorite)**

https://www.gia.edu/gems-gemology/spring-2004-gem-news-international

https://www.gia.edu/gems-gemology/summer-1990-tsavorite-tanzania-kane

https://www.gia.edu/gems-gemology/winter-1982-grossular-garnet-manson

**Andradite Garnet**


https://www.gia.edu/gems-gemology/winter-2014-gemnews-demantoid-baluchistan-province-pakistan

https://www.gia.edu/gems-gemology/spring-2011-demantoid-topazolite-antetezambato-pezzotta

https://www.gia.edu/gems-gemology/spring-2010-gem-news-international

https://www.gia.edu/gems-gemology/winter-2009-demantoid-italy-adamo

https://www.gia.edu/gems-gemology/fall-2009-gem-news-international

https://www.gia.edu/gems-gemology/spring-2004-gem-news-international
https://www.gia.edu/gems-gemology/spring-2003-gem-news-international

https://www.gia.edu/gems-gemology/summer-1996-green-andradite-garnet-phillips

https://www.gia.edu/gems-gemology/fall-1995-garnet-mali-johnson

https://www.gia.edu/gems-gemology/winter-1983-garnet-stockton

https://www.gia.edu/gems-gemology/fall-1981-andradites-payne

**Green-to-Yellow Chrysoberyl**

https://www.gia.edu/gems-gemology/summer-2004-lab-notes

https://www.gia.edu/gems-gemology/fall-2002-gem-news-international

**Andalusite**

https://www.gia.edu/gems-gemology/summer-2009-andalusite-brazil-fernandes

**Green Zoisite**

https://www.gia.edu/gems-gemology/spring-1981-green-zoisite-barot

**Chrysoberyl (Including Alexandrite)**

https://www.gia.edu/gems-gemology/summer-2004-lab-notes

https://www.gia.edu/gems-gemology/fall-2002-gem-news-international


**Green Spodumene**

https://www.gia.edu/gems-gemology/fall-2007-gem-news-international

https://www.gia.edu/gems-gemology/fall-2003-gem-news-international
Diopside

https://www.gia.edu/gems-gemology/winter-2010-gem-news-international

https://www.gia.edu/gems-gemology/spring-2010-gem-news-international

https://www.gia.edu/gems-gemology/winter-2006-gem-news-international

https://www.gia.edu/gems-gemology/fall-2002-gem-news-international

Chalcedony (Including Chrysoprase)


https://www.gia.edu/gems-gemology/winter-2009-chrysoprase-prase-opal-shigley

Green Feldspar

https://www.gia.edu/gems-gemology/spring-2008-gem-news-international

https://www.gia.edu/gems-gemology/winter-2005-gem-news-international

Variscite

https://www.gia.edu/gems-gemology/spring-2016-variscite-central-tajikistan-preliminary-results

Serpentine


Maw-Sit-Sit

https://www.gia.edu/gems-gemology/fall-2001-lab-notes

https://www.gia.edu/gems-gemology/spring-1998-gem-news-international
Assignment 16: Separating Orange, Yellow, and Brown Gems

Diamond

https://www.gia.edu/gems-gemology/summer-2016-labnotes-yellow-synthetic-diamond-nickel-related-green-fluorescence


https://www.gia.edu/gems-gemology/winter-2014-labnotes-irradiated-yellow-diamond

https://www.gia.edu/gems-gemology/summer-2014-labnotes-yellow-cvd-synthetic-diamond


https://www.gia.edu/gems-gemology/winter-1993-russia-synthetic-diamond-shigley


Topaz


Sauer D.A. et al. (1996) An Update on Imperial Topaz from the Capão Mine, Minas Gerais. Gems & Gemology, Vol. 32, No. 4
https://www.gia.edu/gems-gemology/winter-1996-imperial-topaz-brazil-sauer

https://www.gia.edu/gems-gemology/spring-1983-topaz-brazil-keller

Beryl

https://www.gia.edu/gems-gemology/summer-2007-gem-news-international

Spessartine Garnet

https://www.gia.edu/gems-gemology/spring-2008-gem-news-international
https://www.gia.edu/gems-gemology/winter-2001-spessartine-garnet-california-laurs

“Malaya” Garnet


Chrysoberyl


https://www.gia.edu/gems-gemology/fall-2002-gem-news-international

Andalusite

https://www.gia.edu/gems-gemology/summer-2009-andalusite-brazil-fernandes

Danburite

https://www.gia.edu/gems-gemology/winter-2016-danburite-luc-yen-mining-area-vietnam

Feldspar

https://www.gia.edu/gems-gemology/fall-2003-gem-news-international

https://www.gia.edu/gems-gemology/summer-2002-gem-news-international

Citrine Quartz

https://www.gia.edu/gems-gemology/citrine-from-zambia

Pearl

https://www.gia.edu/gems-gemology/spring-2002-yellow-cultured-pearls-pinctada-margaritifera-elen

For Further Reading

*Gems & Gemology (G&G)*, GIA’s professional journal, provides in-depth feature articles on the latest gemological research, from gem treatments, synthetics, and the evaluation of gem quality to developments in gem production, market sources, and more.

To give you the opportunity to learn more about the subjects you are studying and enrich your gemological knowledge, a list of G&G articles relevant to each Gem Identification assignment is provided below. It is important to note that this reading is optional. You will not be tested on the content of these articles.

All G&G articles are available for download free of charge on GIA’s website, www.gia.edu. Copies of these articles are also available at your GIA campus location. Check with your instructor for access to them.

**Assignment 17: Separating Colorless, White, Gray, and Black Gems**

**Diamond**

https://www.gia.edu/identifying-lab-grown-diamonds

**HPHT Synthetic Diamond**

https://www.gia.edu/gems-gemology/spring-2016-gemnews-large-colorless-hpht-synthetic-gem-diamonds-china


Poon P.Y. et al. (2015) Large HPHT-Grown Synthetic Diamonds Examined in GIA’s Hong Kong Laboratory. GIA Research & News

https://www.gia.edu/gems-gemology/spring-2014-ulrika-hpht-synthetic-diamonds


https://www.gia.edu/gems-gemology/spring-1997-synthetic-diamond-properties-shigley

CVD Synthetic Diamond


https://www.gia.edu/gems-gemology/summer-2012-recent-advances-cvd-quality-eaton-magaña


Pearl

https://www.gia.edu/gems-gemology/fall-2016-bead-cultured-pearls-lombok-indonesia


https://www.gia.edu/gems-gemology/spring-2010-gem-news-international

https://www.gia.edu/gems-gemology/spring-2002-yellow-cultured-pearls-pinctada-margaritifera-elen

https://www.gia.edu/gems-gemology/fall-1990-imitation-pearls-hanano

Opal


https://www.gia.edu/gems-gemology/FA13-opal-digit-patterns-rondeau
FOR FURTHER READING

https://www.gia.edu/gems-gemology/summer-2010-opal-ethiopia-rondeau

https://www.gia.edu/gems-gemology/spring-2009-gem-news-international

https://www.gia.edu/gems-gemology/summer-1996-shewa-province-opal-johnson


https://www.gia.edu/gems-gemology/summer-1983-opal-queretaro-koivula

**Feldspar**

https://www.gia.edu/gems-gemology/winter-2006-gem-news-international

https://www.gia.edu/gems-gemology/spring-2005-gem-news-international

https://www.gia.edu/gems-gemology/summer-1997-gem-news-international

**Chalcedony**

https://www.gia.edu/gems-gemology/FA13-dumanska-agate-sidi-rahal

**Diamond Simulants**

https://www.gia.edu/gems-gemology/summer-2016-gemnews-synthetic-moissanite-imitations-synthetic-colored-diamonds


https://www.gia.edu/gems-gemology/spring-2012-zirconia-diamantine-shigley
Assignment 18: Identifying Rough Gems, Parcels, and Mounted Gems

https://www.gia.edu/gems-gemology/winter-2016-gemnews-imitation-rubellite-boulders


https://www.gia.edu/gems-gemology/winter-2014-gemnews-unusual-composite-ruby-rough

https://www.gia.edu/gems-gemology/summer-1997-gem-news-international

Assignment 19: Advanced Laboratory Testing

General

https://www.gia.edu/gems-gemology/fall-2010-analysis-techniques-breeding

Photoluminescence (PL) Spectroscopy

https://www.gia.edu/gems-gemology/spring-2016-photoluminescence-spectroscopy-diamond-applications-gemology

Raman Spectroscopy

https://www.gia.edu/gems-gemology/spring-2010-emeralds-spectroscopy-huong

https://www.gia.edu/gems-gemology/fall-2010-detection-disclosure-heating-mcclure
FOR FURTHER READING

https://www.gia.edu/gems-gemology/spring-2009-stylaster-corals-karampeles


Infrared Spectroscopy

https://www.gia.edu/gems-gemology/fall-2011-amethyst-crystals-karampelas

https://www.gia.edu/gems-gemology/summer-1987-emerald-spectroscopy-stockton

Trace Element Chemistry

https://www.gia.edu/gia-news-research-nr101410


Other

Karampelas S. et al. (2011) UV-Vis-NIR Reflectance Spectroscopy of Natural-Color Saltwater Cultured Pearls from Pinctada Margaritifera. Gems & Gemology, Vol. 47, No. 1
https://www.gia.edu/gems-gemology/spring-2011-saltwater-pearls-karampelas

https://www.gia.edu/gems-gemology/summer-2010-pearls-microtomography-karampelas

https://www.gia.edu/gems-gemology/summer-2010-pearls-microtomography-krzemnicki