

# The Literature Of Gem-Bearing Granitic Pegmatites

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## Major Gem-Pegmatite Districts of the World



- Major Gem-Pegmatite Districts of the World. Source: Simmons, W.L. & No. 4, August 2012, W.S. Simmons et al.
1. Bushy Mts. Idaho
  2. Bushy Mts., No. Colorado, No. Idaho
  3. Pederneiras, Aracaju, Bahia, Pernambuco, Tocantins
  4. O. K. Oregon, Oregon, No. Idaho
  5. Keweenaw, Michigan
  6. Pederneiras, Pernambuco, Tocantins
  7. Nevada, Nevada, Oregon, Idaho
  8. Zambian Central, Zambia
  9. Nevada, Nevada
  10. Oregon, Oregon
  11. Nevada, Nevada, Oregon, Idaho
  12. Zambian Central, Zambia
  13. United States, California, New Mexico, Texas, Nevada
  14. United States, Colorado, Oregon, Idaho
  15. July 1916
  16. Unknown, Oregon
  17. Nevada, Colorado, South Dakota
  18. Nevada, Idaho, Washington
  19. Nevada, Colorado, Idaho, Utah
  20. Oregon, Oregon
  21. China, China
  22. Myanmar, Myanmar, Thailand
  23. Vietnam, Vietnam
  24. India, India
  25. Afghanistan, Russia, Myanmar
  26. Pakistan, India, Afghanistan



In the **Pederneira mine** Federico Pezzotta is in the Dip slope where large crystals of garnet and schorl can be seen near the bottom of the pegmatite. Photo by Andrea Dini.



The **Emmons Pegmatite** is part of the central Oxford Pegmatite Field (OPF) in Maine. Well-developed schorl tourmaline combs formed at the contact. Photo by Ray Sprague.



Journal of Gemmology Editor-in-Chief Brendan Laurs at the **Rose Quartz mine, Meza Grande, California**. Photo by Matt Taylor.

## Origin of Pederneira Pegmatites

In Brazil the **Pederneira pegmatites** belong to the São José da Safira district. They are part of the Eastern Brazilian Pegmatite Province in the states of Minas Gerais and Bahia. The country rock host consists of biotite-garnet-mica schists. The pegmatites were emplaced during the Araçuaí orogeny (630–480 Ma). Co-authors of the Pederneira issue of *The Mineralogical Record*, 2015, Pezzotta and Dini examined the geology, pegmatite structures and paragenesis of the pegmatites. (See photo above). The Pederneiras are exceptional examples of an lithium-cesium-tantalum (LCT) pegmatites formed by fractional crystallization in terms of the number and size of the miarolitic cavities (pockets). The chemical makeup of the pegmatite includes B, Li, Be, F, Fe, (PO<sub>4</sub>)<sup>3-</sup>, and Mn. Electron microprobe work by the authors have identified the tourmalines as elbaite with an elevated rossmanite component in some pink areas.

## Origin of the Emmons Pegmatite

The **Emmons Pegmatite**, ~265 Ma, is part of the central Oxford Pegmatite Field (OPF), Maine. The pegmatite intrudes ~376 Ma (as seen in photo above), migmatitic country rock. In Falster et al. (2019) the authors propose a model for OPF pegmatite formation by direct anatexis. In this model, partial melting (anatexis) of migmatites and metasediments at depth produces pegmatite melts enriched in incompatible elements and volatiles compared to granites. This melting takes place over a large area at depth and as melts form they ascend rapidly as dikes and are emplaced at shallow levels. Upon emplacement, the pegmatite melt will crystallize and undergo fractional crystallization. In some cases this leads to extraordinary enrichments in elements like Li, Be, Cs, etc. and miarolitic pockets can form that host the spectacular crystals that pegmatites are so famous for.

## Today's Urgency for Strategic Pegmatite Minerals

Industrial needs for pegmatite minerals containing lithium, tantalum, niobium, cesium, boron, fluorine, uranium, and beryllium have always driven exploration, mining, and processing of pegmatites. The demand is even more pressing today and will be in the future.



**Spodumene (unzetti)**: gem 48.70 ct, w/ 5.5 cm long, Big Kahuna II Pocket, Baker Boulevard, Oceanview Mine, Pala, Pala District, San Diego County, California. Private collection. Photo by Mark Maubauer.

Spodumene is a major source of the lithium critical for lithium-ion and lithium iron phosphate batteries for energy storage and electric vehicles. Spodumene occurs nearly exclusively in pegmatites. Dutrow (2021).

## James Shigley Provides Gem Granitic Pegmatite References



Tourmaline (elbaite) up to 3.7 cm long, Big Kahuna Pocket, Oceanview Mine, Pala District, San Diego Co., California, USA. Oceanview Mines, LLC specimen. Photo by Mark Maubauer.



James Shigley

The QR Code will take you to *Gem Granitic Pegmatite References* prepared by James Shigley, Distinguished Research Fellow at the Geological Institute of America. The list is updated regularly. This information is invaluable to those interested in gemological research and the study of pegmatites.



Gem Granitic Pegmatite References

## Celebrating 40 Years of the Geo-Literary Society



From left: Elna Hauck, Herb Obooda, Alexandra Filor, Cliff Kruger, Russ Filor, Curtis Schuch, Fred Pough, John Sinkankas, and Jack Givin. Photo by Terry Hurling.

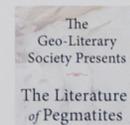
The Geo-Literary Society was founded 40 years ago at the Tucson Gem & Mineral Show. In 1974 a group of mineral and gem enthusiasts formed an organization for bibliophiles. This photo shows its first officers.

The Geo-Literary Society is dedicated to exchanging information about books, maps, and related print and digital matter on the natural substances of the Earth. Our goal is to provide a platform for individuals who are passionate about these topics to collaborate.



19th Annual Sinkankas Symposium Proceedings: San Diego County Gems and Minerals, 2023. Photo by Robert Weldon.

The Geo-Literary Society Co-Sponsors Sinkankas Symposium, 2022–2023. See Academia.edu for a copy.



The Geo-Literary Society www.geoliterarysociety.org



From left: **Beryl (elbaite)**: 4.5 cm tall, Volodarsk-Volynskii, Zhytomyr Oblast, Ukraine. **Quartz (smoky amethyst)**: 1.7 cm tall, Little Gem Mine, Boulder Batholith, Jefferson County, Montana, USA. Rose Quartz collection. Photo by Mark Maubauer.



**René Just Haüy** (1743–1822). A French geologist and mineralogist is called the father of modern crystallography. He is credited with introducing pegmatites to describe granite in his 1807 work *Traité de minéralogie*, Vol. 4, p. 435. A downloadable digitized copy can be found on the GSA Library site on Internet Archive.



Pegmatite next appeared in print in the 1812 work by **Alexandre Brongniart** (1769–1847). Brongniart ascribed the word pegmatite to Haüy.



Geologist **Wilhelm Karl Ritter von Haidinger** (1795–1871) used pegmatite correctly in his 1848 work *Handbuch der Bestimmender Mineralogie*, p. 585. A downloadable digitized copy can be found on the GSA Library site on Internet Archive.



## Definition and Early Use of the Term Pegmatites

Earth's most magnificent rocks, have been recognized for their unique textures for hundreds of years. The word pegmatite from the Greek word (pēnym), which means to bind together, refers to the interlocking crystals of varying sizes. Many of the world's largest crystals formed in pegmatites.



More about Major Gem-Pegmatite Districts of the World



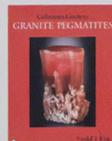
**Early Gems in Pegmatite Research**  
Top Left: **Alfred Lacroix** (1863–1948), French mineralogist and geologist specialized in French and Mexican pegmatites.



Left: **Alexander U. Fersman** (1863–1945), Russian geologist and mineralogist specialized in Russian pegmatites and pegmatite classification.



**20th Century Pegmatite Leaders**  
From left: **Richard H. Jahn** (1915–1993) Geochimist at U.S.G.S. and Stanford University specializing in strategic minerals, mapping, and texture studies of pegmatites. **Peir Carré** (1914–2018), Czech mineralogist, professor, University of Manitoba, known for his discovery of tantalum-lithium-cesium mines. He developed an early classification for pegmatites.



**21st Century Important Pegmatite Books**  
From left: *Collector's Guide to Granite Pegmatites*, **Vandell T. King**, *Pegmatites and Their Gem Minerals* by **Michael Menzies** and **Jeffrey Scovil**, *Pegmatology 2nd Edition* by **William "Skip" Simmons**, **Karen L. Webber**, **Alexander U. Falster**, **Encar Roda-Robles** and **Donald A. Dullaire**