Pallasites
Gemstones From Space
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What Are Pallasites?

- Stony-iron meteorite
- Named after German naturalist Peter Simon Pallas
- Contain olivine (Peridot) crystals in iron-nickel matrix
- Peridot is a silicate ($\text{Mg-Fe}_2\text{SiO}_4$)
- Olivine is more abundant than metals by ratio of 2:1
Arrows the gold-brown areas are the peridot crystals. The silvery area is the nickel-iron matrix in which the peridot is suspended.
Peridot

• Peridot is the gemstone that occurs in pallasites
• Peridot is an olivine mineral
• Has a Mohs hardness of 6.5-7.0
• Can be yellow-green, olive-green, or brownish.
• Has been mined for thousands of years.
• Mentioned in the bible as chrysolite.
• Has greasy to vitreous luster.

**Peridot.** Craig Coyne website.  
[www.craigcoyne.com/site/gemstones/peridot](http://www.craigcoyne.com/site/gemstones/peridot)
Where do Pallasites Come From?

- Pallasites are pieces of asteroids or planetesimals.
- These pieces were broken off by impacts or never fully formed.
- Originated from core-mantle boundary of celestial bodies.
- They travelled in from the asteroid belt.

*Pallasite Source Diagram.* Planetary Science Research Discoveries. (June 2010)
How Do Pallasites Form?

Diagram of Pallasite Formation. Planetary Science Research Discoveries. (June 2010)
Some Famous Pallasites...

- Brenham Pallasite
- Found in Kiowa County, Kansas
- Worlds largest pallasite (1,400 lbs.)
- First recognized as a meteorite in 1882 by F.W. Cragen of Washburn University.
- Record breaking piece found in 2005 by Steve Arnold using sophisticated metal detecting equipment.

_Brenham Pallasite_. Brenham Pallasite Meteor People webpage.
Famous Pallasites

- Fukang Pallasite
- Found in Xinjiang Province near Fukang, China.
- Found in 2000
- Over 925 lbs
- World renowned as the most spectacular example of a pallasite.

10kg chunk of Fukang Meteorite.
Southwest Meteorite Laboratory website.
Famous Pallasites

- Seymchan Pallasite
- Found in dry river ben of Hekandue River near Magadan, Russia.
- Main mass found in 1967 by geologist F.A. Mednikov
- Weighs 272.3 kg
- Did not find pieces containing olivine until 2004 when it was classified as a pallasite.

*Seymchan Pallasite. Arizona Skies Meteorites website.*
People and Pallasites

- Pallasites were formed into tools or adornments by Native Americans.
- Pallasites were found in burial mounds of the Hopewell tribe in Ohio.

*Hopewell Burial Mounds.*
Toledo Blade website.
Today people fashion pallasites into jewelry. This jewelry can be made of slices of the pallasite including peridot suspended in the iron nickel matrix. In some pallasites the peridot crystals are large enough to be faceted. Polished slices of pallasite usually sell for $20-$40/gram. Like anything however, market forces determine the price of any individual piece. Faceted pallasite peridot fetches a higher price than its earthly counterpart. The .48 ct stone on the left sold for $1200.
References

• KnowledgeBank website. http://kb.osu.edu/dspace/bitstream/handle/1811/4817/V61N06_341.pdf?sequence=1
• “Peridot” Craig Coyne website. http://www.craigcoyne.com/site/gemstones/peridot
References

• Brenham Pallasite Meteor People webpage. http://www.meteoritetimes.com/Back_Links/2006/February/Meteorite_People.htm