

TEKTITES



WHAT ARE THEY?

Tektites are pieces of natural glass that are found only in certain areas of the Earth's surface. The name comes from the Greek word 'tēktos', which means 'melted', or 'molten'.

They vary in size from a few inches in diameter to just a few tens of micrometres. Most tektites are blackish in colour but they vary greatly and some can be a deep emerald green (Moldavites) and some yellow (Egyptian Desert Glass).

ARE TEKTITES METEORITES?

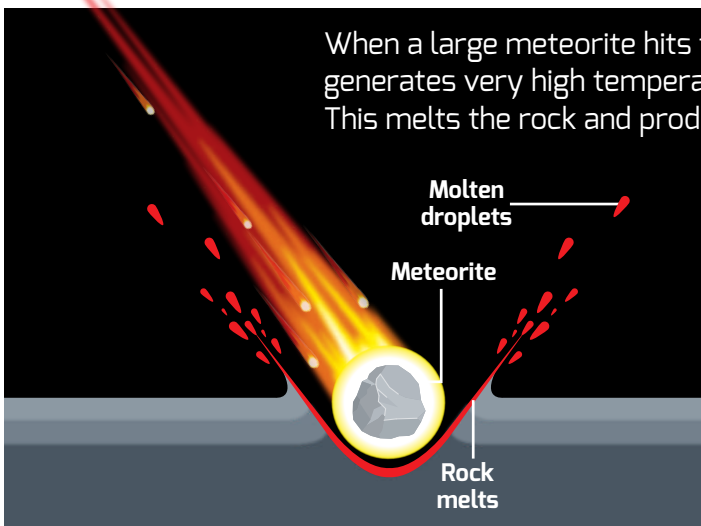
No, tektites are formed when meteorites impact the Earth, but they are mostly made up of melted terrestrial rock (sometimes with a little bit of meteorite mixed in).

HOW ARE THEY FORMED?

When a large meteorite hits the Earth, the impact generates very high temperatures and pressures. This melts the rock and produces clouds of molten silicates that are

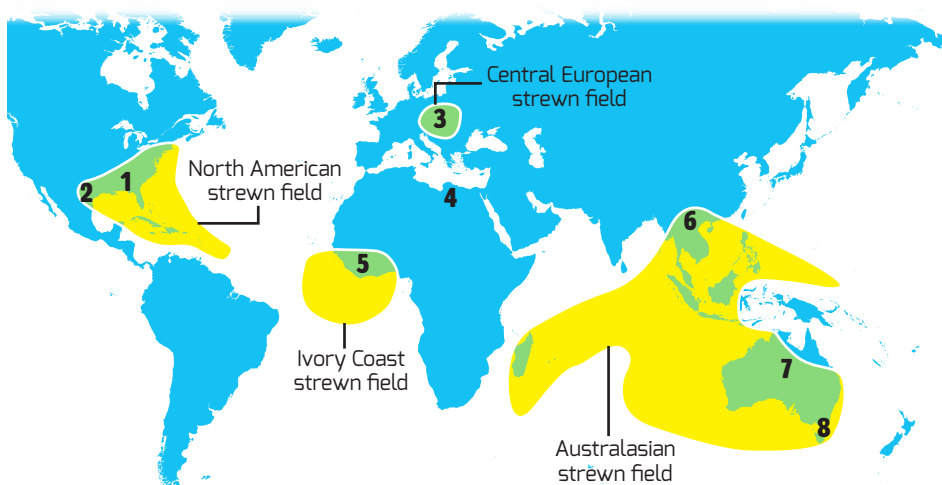
ejected into the upper atmosphere at enormous speeds. These droplets and large blobs rapidly cool into a glassy form and then fall back to Earth as tektites.

Their shape depends on how far into the atmosphere they were ejected and how far away from the impact site they landed. Those that land close might still be molten when they impact and land as 'splats'. Those that were ejected high into the atmosphere can be reheated by friction as they fall back to Earth and remelt before cooling once more to look a lot like meteorites themselves.



WHERE ARE THEY FOUND?

Tektites are only found in specific areas, called 'strewn fields'. Each strewn field is associated with a particular meteorite impact.



A tektite's name relates to where it was found.

1. Georgia tektites
2. Bendasite tektites
3. Moldavites
4. Libyan Desert tektites
5. Ivory Coast tektites
6. Indo-Chinese tektites
7. Australian tektites
8. Darwin tektites

VOLCANIC GLASS OR TEKTITE?

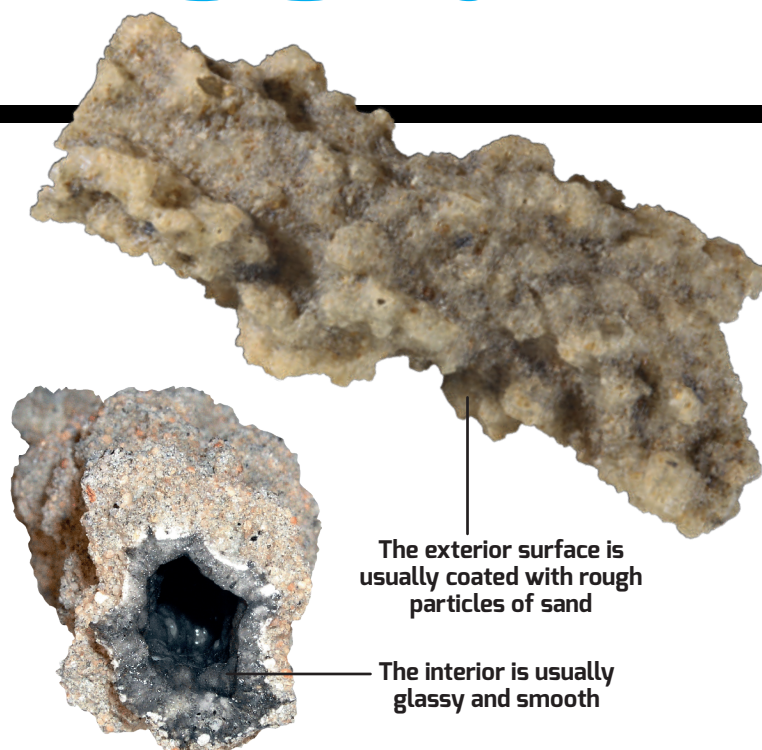
Tektites are not the only naturally occurring glass. Some glasses are made when lightning strikes sand and melts it and volcanic glass, or obsidian, is made during volcanic eruptions. Tektites have a much higher melting point and contain a thousand times less water than volcanic glass.



FULGURITE

WHAT IS IT?

Fulgurites are natural glass formations created when lightning strikes sand, soil or rock. Sometimes called 'petrified lightning', or 'lightning stones', fulgurites are complex hollow structures that look a bit like a nobbly vegetable root. They are formed from particles of sand that have been melted and fused by lightning. Fulgurite tubes can be metres long and several centimetres in diameter, but fulgurites are very fragile so usually smaller fragments are found. Their colour depends on the sort of sand they formed in – ranging from pale tan to black.

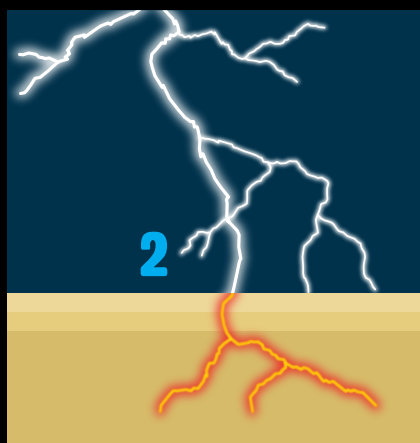


HOW DOES IT FORM?

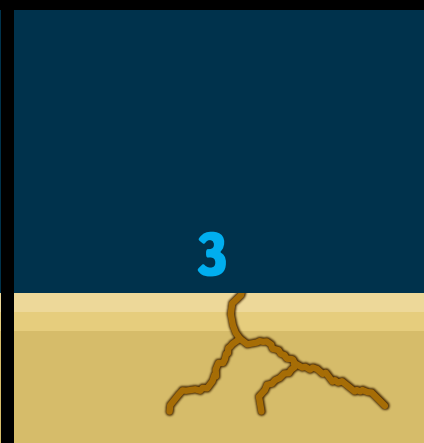
1. The air around a bolt of lightning can be super-heated to a temperature of more than 27,000°C (that's nearly three times hotter than the surface of the Sun).



2. When lightning strikes sand, it is conducted through it. The immense heat melts the sand grains and fuses them together.



3. When the sand has cooled, the path of the lightning is preserved as fulgurite tubes.



WHERE IS IT FOUND?

Because fulgurite can form anywhere that lightning strikes sand, it is found all over the world. However, because fulgurite is extremely fragile it isn't found very often.

There are two types of fulgurite:

Sand fulgurites are formed from sand in beaches or deserts – and have a more glass-like interior and are very fragile.

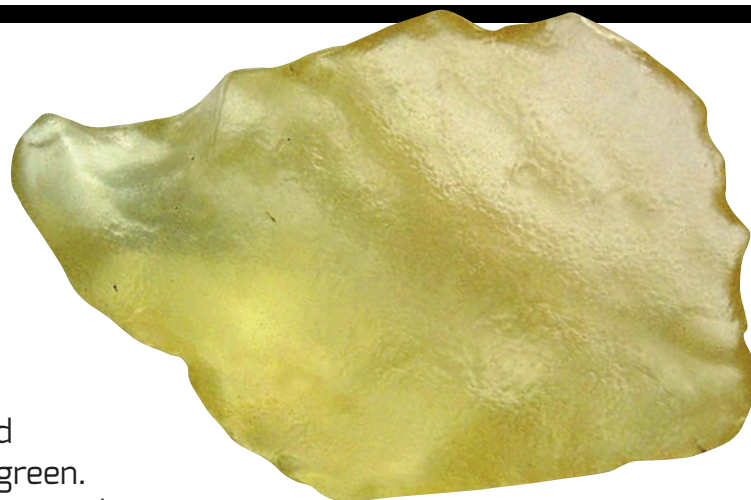
Rock fulgurites are much rarer and are formed when lightning strikes rock – creating veins inside the rock.



WHAT IS IT?

Libyan Desert Glass is a form of tektite and is one of the most unusual natural glasses ever discovered. It is a naturally occurring glass that is found in the Libyan Desert in the north of Africa. It is made up almost entirely of silica (about 98% silicon dioxide).

Libyan Glass is transparent, or semi-transparent and varies in colour from clear/opaque white to yellow/green. The size of pieces varies from a few centimetres to some that weigh several kilograms (the largest ever found was 28kg).



WHERE IS IT FOUND?



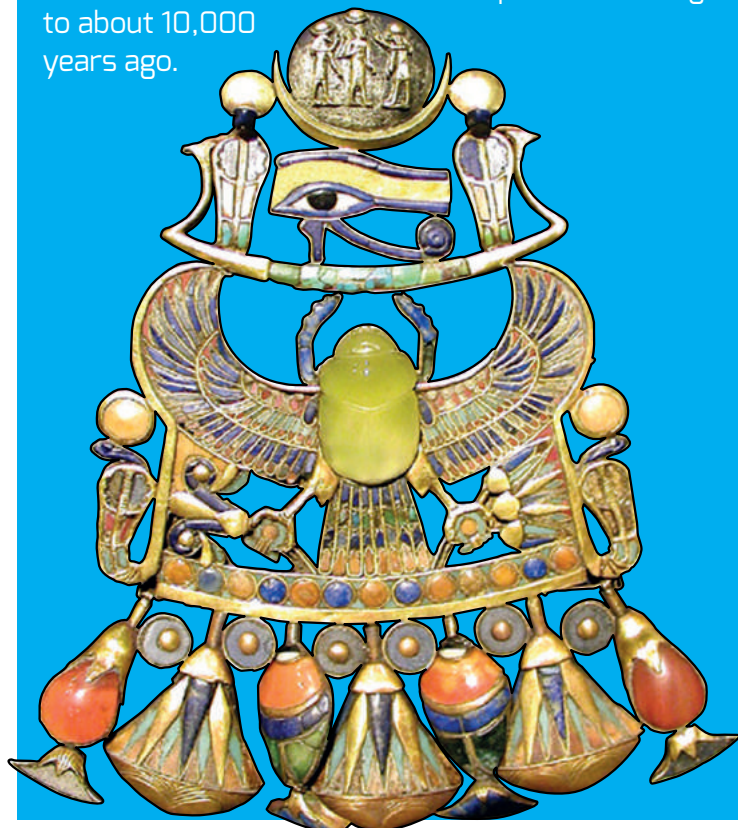
Libyan Desert Glass is found in the Libyan Desert, scattered along the border between Libya and Egypt. The glass found in this area is the largest known deposit of natural silica glass on the planet.

HOW DID IT FORM?

Although a meteorite impact site has yet to be found, evidence suggests that Libyan Glass was formed about 29 million years ago as a result of a meteorite impact on the surface, or a meteorite explosion above the surface, which melted and fused the sand.

ROCK OF GOD

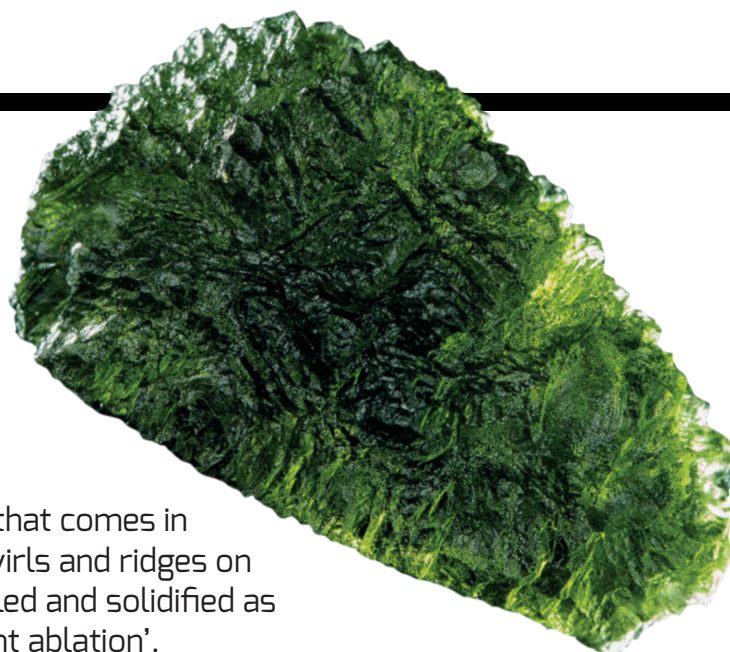
Libyan glass was known to the ancient Egyptians who called it 'the Rock of God' and used it in Tutankhamen's pectoral pendant in the central scarab. It was even known to prehistoric peoples who used it for tools, such as sharp blades, dating to about 10,000 years ago.



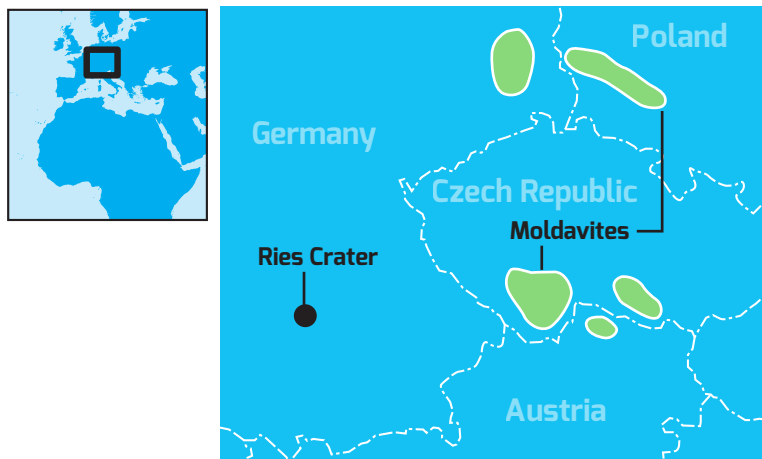
WHAT IS IT?

Moldavite is a form of tektite and is the only tektite considered to be a gem stone. It is a natural glass that is very similar in composition to the volcanic glass, Obsidian. It is mostly made up of silicates – with the rest being made up of aluminium oxide and other minerals.

Moldavite is a transparent or semi-transparent glass that comes in shades of green, blue-green and brown-green. The swirls and ridges on its surface were created as the molten moldavite cooled and solidified as it fell through the atmosphere – a process called ‘flight ablation’.



WHERE IS IT FOUND?



The majority of moldavites are found in the Czech Republic – they get their name from the Moldau River where the first pieces were found. Moldavites have also been found in Poland, Germany and Austria as part of the Central European strewn field.

HOW DID IT FORM?

It is believed that moldavite was formed about 15 million years ago when a large meteorite impact formed the Ries Crater in what is now modern Germany.

GRAIL STONE

Moldavite is sometimes called the ‘Grail Stone’ because, according to legend, the Holy Grail was decorated with a green jewel made of moldavite. During the Middle Ages, only those who were considered royalty or the highest nobility were permitted to wear jewellery fashioned from moldavite.

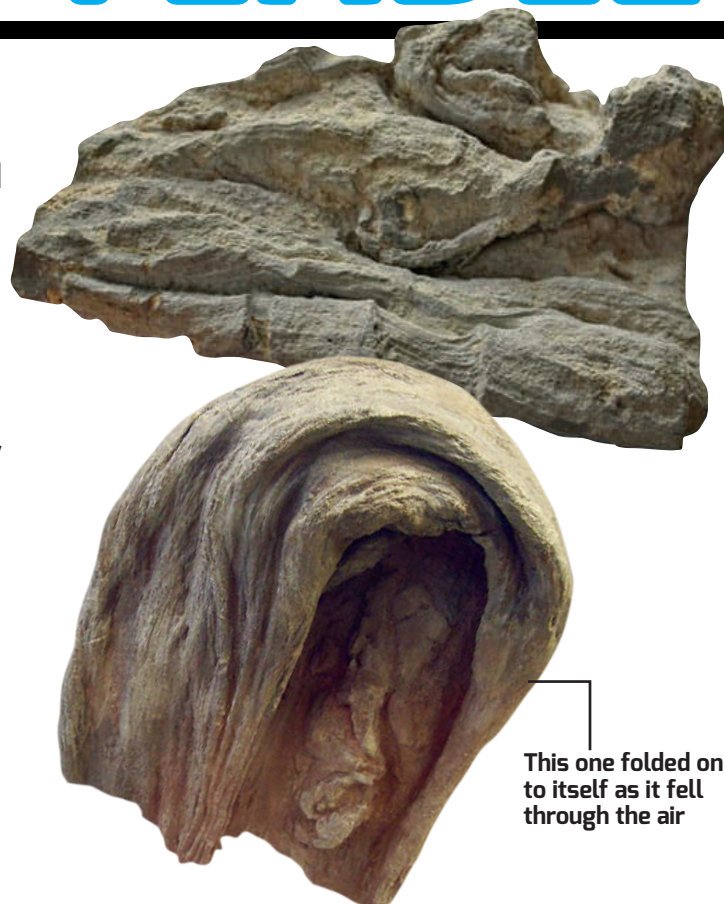


RIES FLÄDLE

WHAT IS IT?

Flädle is a sort of glass bomb – rather like those created by volcanic eruptions. They are large blobs of terrestrial rock that melted into glass during large meteorite impacts. They are also known as crater glasses. Crater glasses contain more water than tektites and are found in and around the impact crater.

Flädle looks a bit like large chunks of old toffee – usually brown, with folds and collapsed bubbles. Chunks of flädle can weigh many kilograms.



WHERE IS IT FOUND?



Ries Flädle is found in and around the Ries Crater in Germany.

HOW DID IT FORM?

It is believed that Ries Flädle was formed about 15 million years ago when a large meteorite impact formed the Ries Crater in what is now modern Germany.

It is made up of large blobs of ash, rock and molten glass that are thrown from the site of a meteorite impact.

Flädle is not thrown as high or far as tektites, which means that, when it lands, the blobs are still semi-molten. Because they are semi-molten, they stretch like warm toffee and can fold and flatten when they land.

UGLY DUCKLING

Ries Flädle is associated with the same impact crater as moldavite but, compared to its beautiful, green cousin, flädle really is a bit of an ugly duckling.



FLAT CAKE

Because the glass bombs are often flattened when they land, Flädle gets its name from the German word for pancake, or flat cake.



LONAR GLASS IMPACTITE

WHAT IS IT?

Lunar Glass impactites are a sort of impact glass. Their texture and chemistry shows that the massive temperatures and pressure of a meteorite impact turned solid basalt rock (solidified lava) into a frothy, glass-like material. They have a very high silica content.

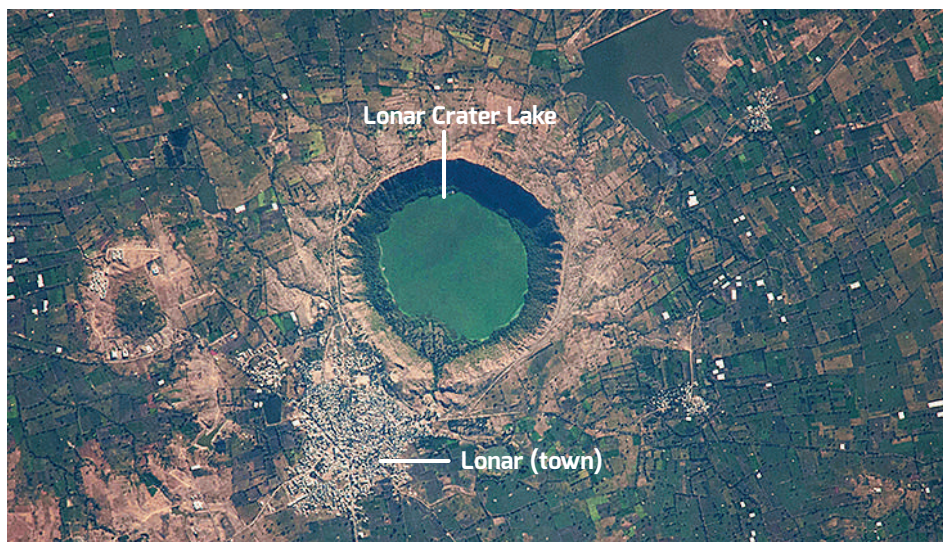
Lunar impactites have a frothy, brown-black appearance that makes them look very similar to lava ejected from a volcanic eruption. They range from a few millimetres to 10-15 centimetres in diameter.



WHERE IS IT FOUND?



Lunar glass impactites are found around the rim of the Lonar Crater in India.



The Lonar Crater is about 1.8 kilometres wide, 137 metres deep and is filled with water.

HOW DID IT FORM?

It is believed that Lunar impact glass was formed about 500,000 years ago (some estimates place it at about 50,000 years ago) when a large meteorite impact formed the Lonar crater in India.

NO MOON REQUIRED

The impact glasses found around the Lonar Crater in India helped scientists to determine how tektites are formed. It had been thought that tektites might be created by meteorite impacts on the Moon – that threw material into space, which then found its way to Earth. Finding tektite-like material so close to a known terrestrial impact crater at Lonar helped to show that tektites are created by meteorite impacts here on Earth.

