

best conditions. Some organisms, such as clamshells, **dinosaur** skeletons, and tree trunks, have hard parts in their bodies. They are discovered much more often than fossilized jellyfish or fungi.

Even organisms with very high preservation potentials are not guaranteed to become fossils. All the conditions have to be just right. It is very unlikely that any individual organism will become fossilized. Fossils that do form are often destroyed. This can happen because of **weathering**, **erosion**, plate tectonics, or other **rock cycle** processes.



Fossil Formation

Fossils only form under the right conditions. What conditions increase preservation potential?

Fossilization Processes

The process of turning an organism or trace into a fossil is called fossilization. There are several different types of fossilization. The higher the preservation potential, the more likely that original material from the organism will be

preserved. The following fossilization processes are listed in order of how much original material from the organism remains in the fossil:

- **Preservation of original material**: Sometimes part or all of the original organism remains. This can last even after thousands or millions of years. Fossils formed by preservation of original material include mummified fossils. They also include remains preserved in **amber**, tar pits, or ice. Sometimes, organisms' bodies dry out very quickly before they decay. Then they can become mummified. Their bodies will be shriveled. But much of the original material will remain. Insects or other small organisms that were trapped in tree sap thousands of years ago can remain unchanged. They stay the same even after the sap turns into a hard material called amber. The original shells of organisms such as clams or snails can remain exactly the same. Woolly mammoths have been found frozen in ice with their bodies still intact.



Preserved Remains

Not all fossils are made of stone. How can the original material of an organism's body be preserved?

- **Carbonization**: Organisms contain **carbon**. Sometimes, when an organism dies, the carbon in its body starts to break down. Some of the original

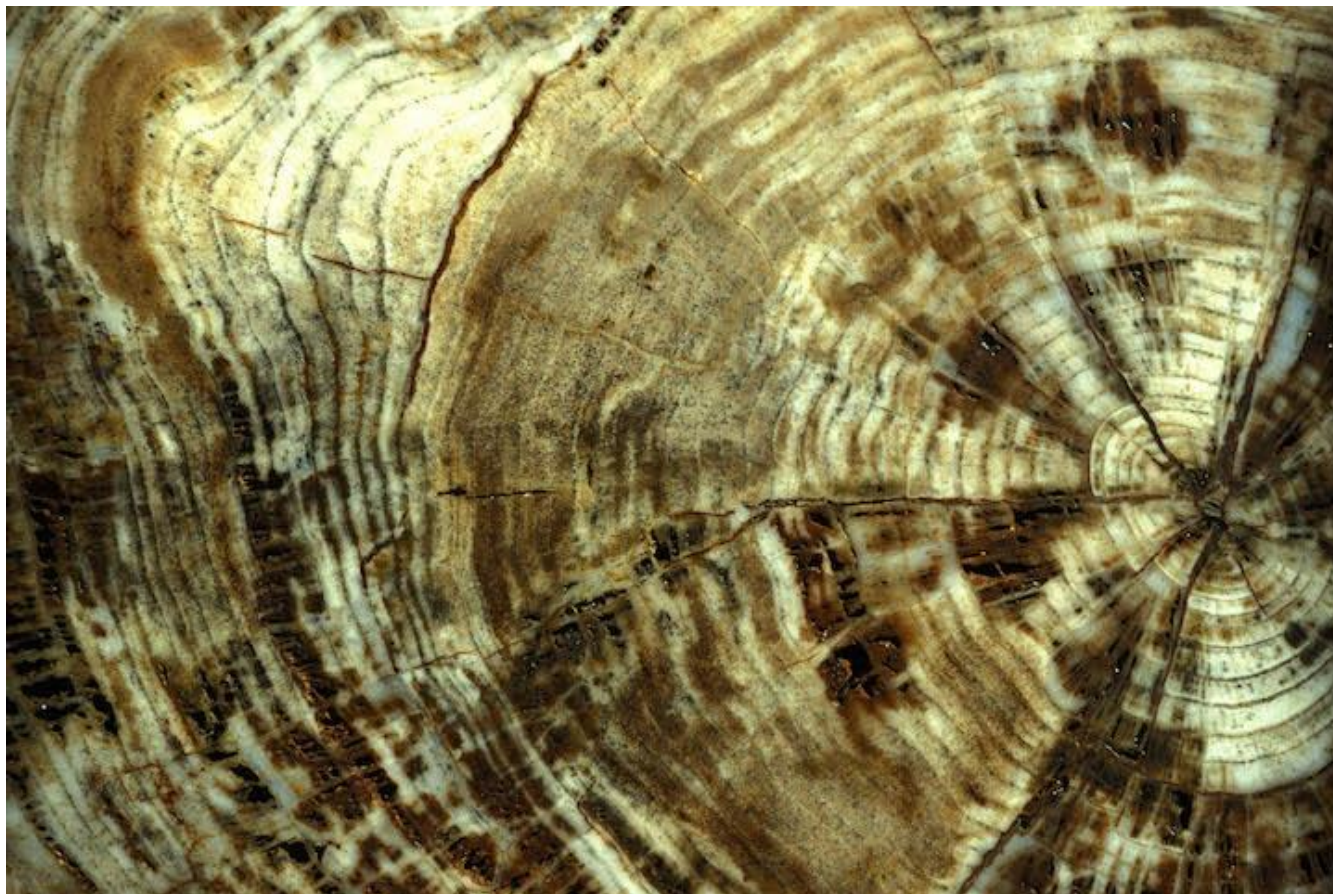
material is decayed. However, the carbon also forms a dark coating on top of the dead organism. This preserves the organism's body as a carbonized fossil. Carbonized organisms can be very well preserved. Even details such as the patterns or colors of skin or leaves can remain.



Carbonization

The fish in this image was preserved through carbonization. What is the black coating on top of this fossil?

- **Permineralization**: Permineralization occurs when the small holes in an organism's body are filled with minerals. This happens when water containing dissolved minerals is absorbed by an organism's body. When the water evaporates, the minerals are left behind. Permineralization only replaces some of the original body material with minerals. Some petrified wood is formed by permineralization. Permineralization can preserve very delicate details. Sometimes even individual cells are preserved.



Permineralization and Petrification

This may look like a regular piece of wood, but it is actually stone. How did permineralization help create this fossil?

- **Petrification**: Petrification occurs when an organism's body tissues are replaced by minerals. This process is similar to permineralization. However, it is unlike permineralization. Petrification does not usually preserve the original body material. Petrification does preserve the shape of the organism's body. Different minerals can replace the original body material. Pyritized fossils occur when the **mineral** pyrite replaces the original material of an organism. Pyrite is known as "fool's gold." Pyritization produces beautiful, shiny, gold-colored fossils. Some petrified wood is formed by permineralization. But much of it is formed by petrification.



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Petrification

Petrification is the complete replacement of an organism's body by minerals. How does petrification form fossils?

- **Casts and molds**: Casts and molds are fossils that form when the body of an organism leaves an imprint in the **sediment**. This imprint remains even after the original body material has completely decayed and disappeared. A **mold** is an impression left by an organism's body or trace. Examples include a footprint and burrow. Sometimes sediment fills in these molds and hardens into rock. Then a **cast** can form. A cast is a fossil copy of the original organism or trace. Casts and molds are often found together.