

What's in a Coal?

We all know what coal is, it's a black rock that burns! But it's not as simple as that. Coal is a **biochemical** rock, formed mainly from plants. While rocks like sandstone or shale are made of specific minerals with constant physical properties, coal is a mixture of organic grains called **macerals** and inorganic mineral grains, known as **mineral matter**, which makes up the ash left behind when coal is burned.



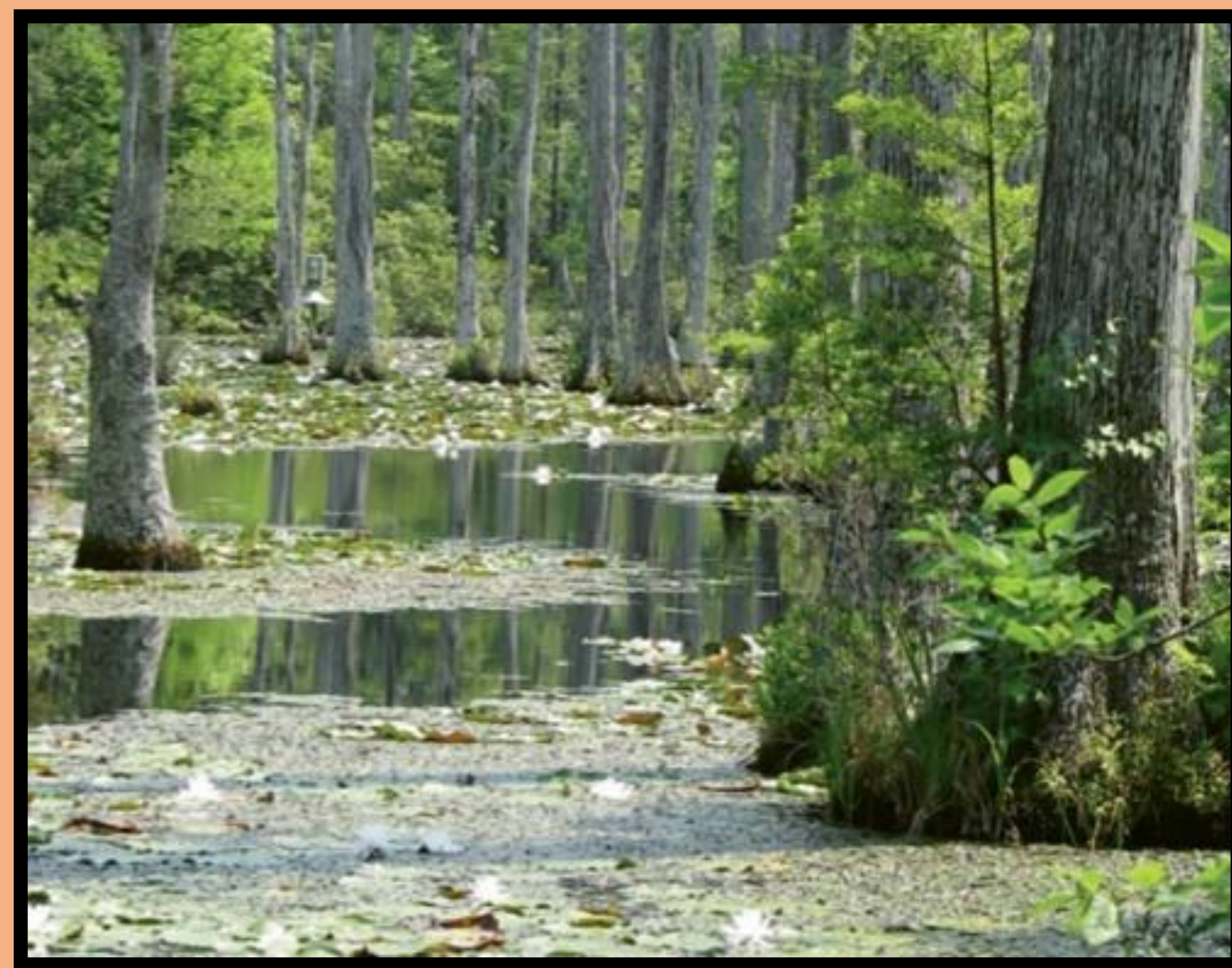
An example of banded coal. Notice the bright, shiny layers, called **vitrain**. These maceral bands are formed from layers of bark, stems, or roots.



A common mineral in coal is pyrite, or 'fools' gold'. This bright brassy-yellow mineral reacts with water to cause acid mine drainage, which is unsightly and harmful to streams and aquatic life.

How is Coal Formed?

Coal forms in swamps. Swamps are ideal because they support abundant plant life, which eventually die and are preserved in the shallow, low-oxygenated swamp waters. Over time it accumulates into a thick layer called **peat**.

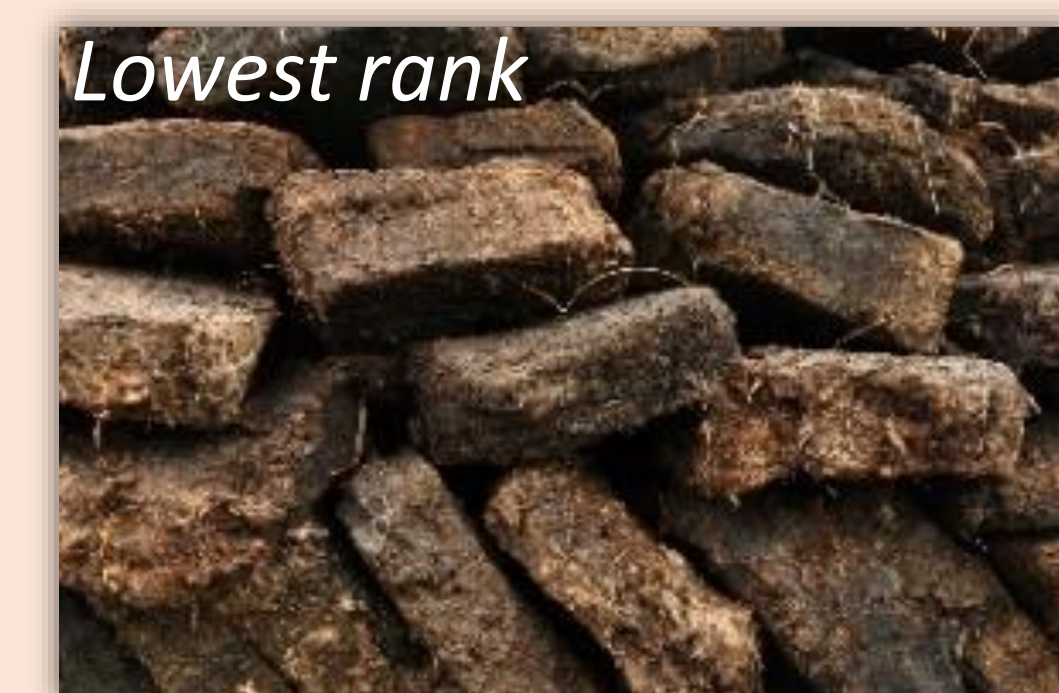


Other special conditions for peat to form include:

- Abundant moisture, such as in a tropical rain forest.
- A sinking or deepening basin, which geologists refer to as **subsidence**.

Did you know? Peat is forming today in WV in places like Canaan Valley. However, it will likely be eroded away before it can be buried and heated to form coal.

Peat + Heat = Coal Ranks



Peat



Lignite



Sub-bituminous



Bituminous*



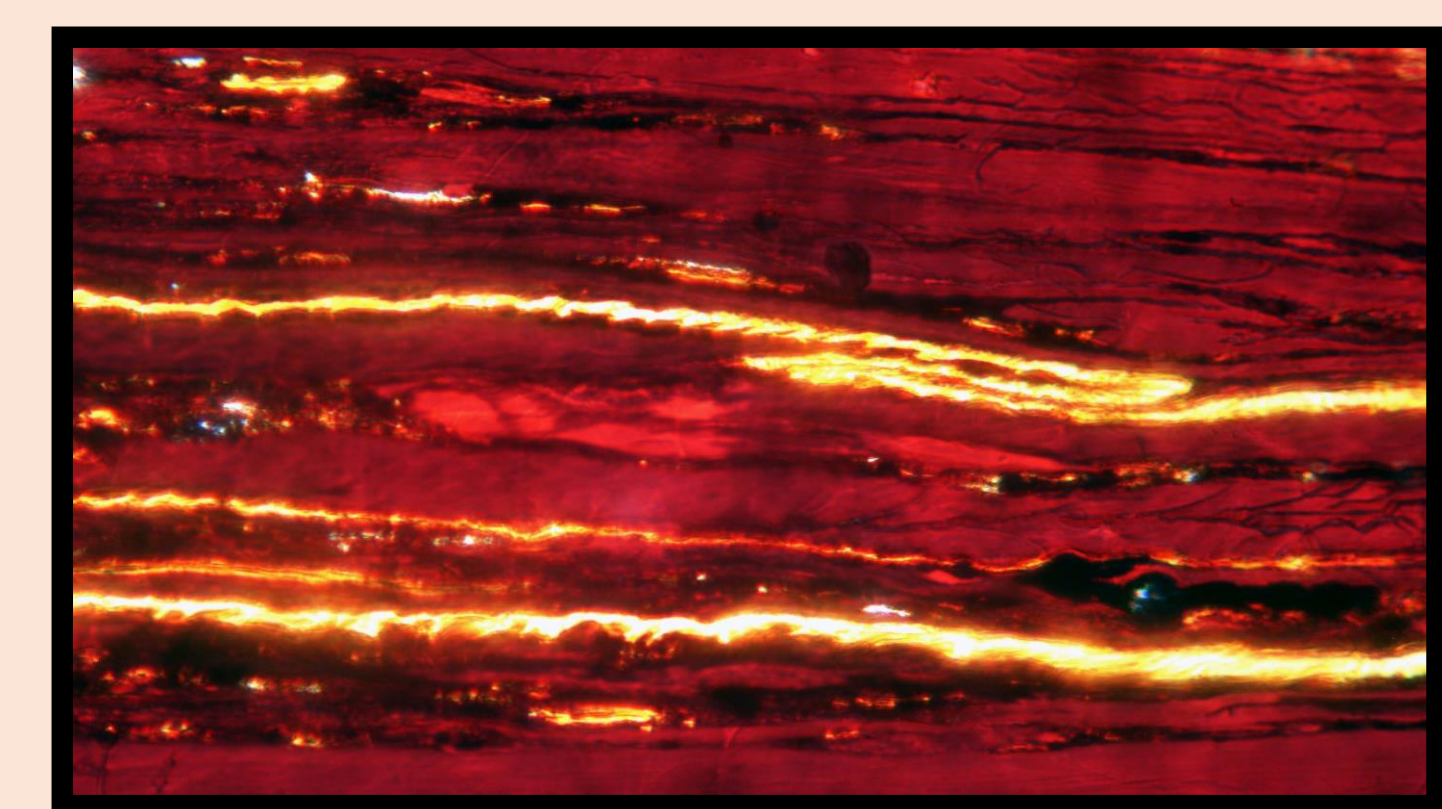
Anthracite



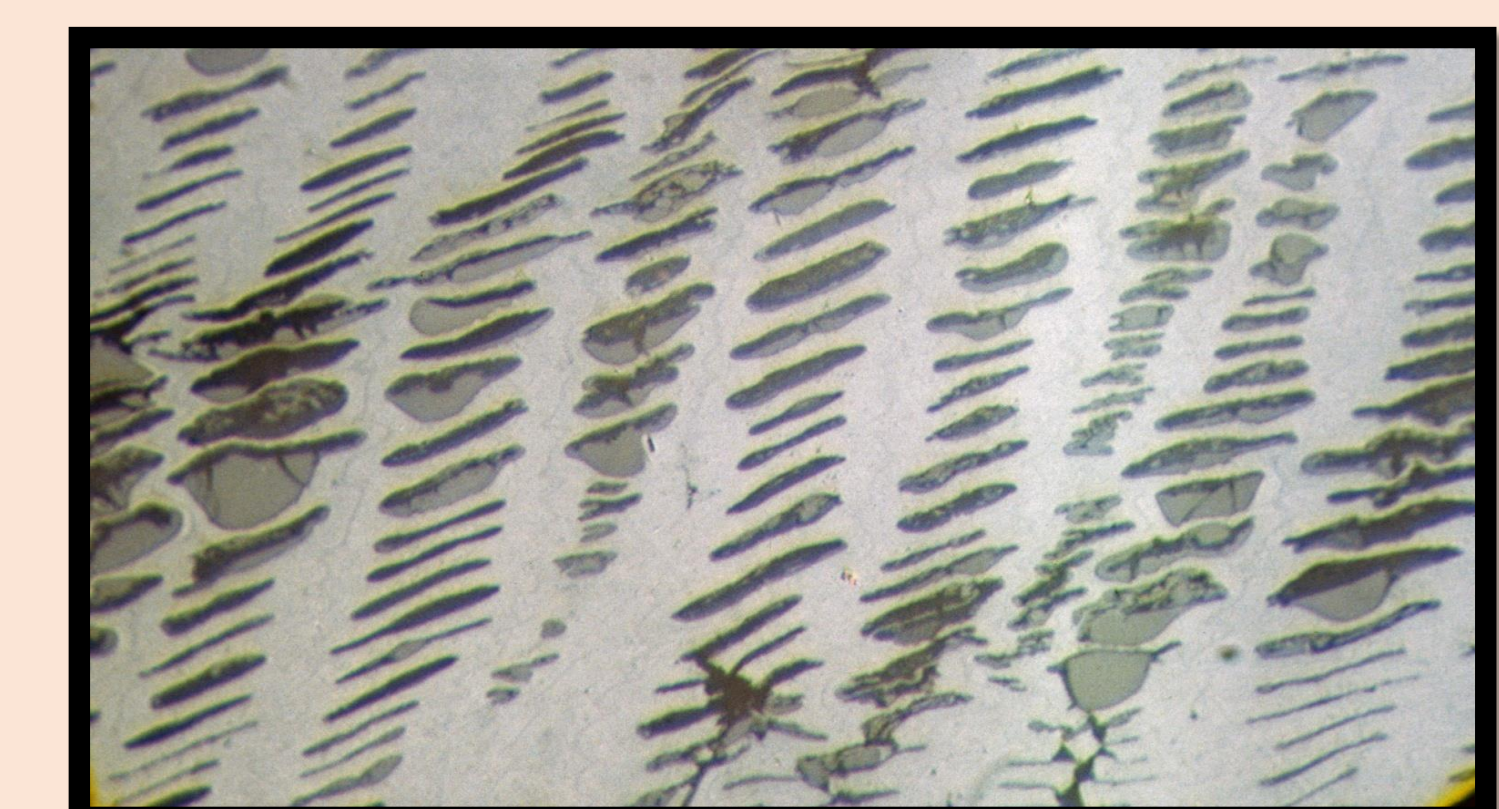
Graphite

*** All of West Virginia's coal is bituminous in rank**

Deeply buried peat is slowly "cooked" over millions of years, converting the peat into coal. This is called **coalification**. As coalification progresses, the original plant material increases in carbon content. **Rank** is the classification system used to characterize coal by carbon content. From least carbon to most, the rank is: peat, lignite, subbituminous, bituminous, anthracite, and graphite.



Thinly sliced bituminous coal seen through a microscope under transmitted light



Fossil charcoal seen through a microscope showing preserved cell walls.