How are Graphite Fibers Produced?

• A precursor material, which is rich in carbon, is subjected to pyrolysis to extract its carbon content.
  
  o Pyrolysis: Thermo-chemical decomposition of organic material when it is subjected to elevated temperatures, but no oxygen. Through such a the precursor organic material breaks down into gases, liquids, and a solid residue which is rich in carbon.
  o Precursor: It is a carbon-rich chemical compound, used as “raw” material for pyrolysis.

• Currently, three materials are used as precursors. These are:
  
  o Polyacrylonitrile (PAN)
  o Pitch: It is a viscous substance produced by plants, and also extracted from petroleum.
  o Rayon: It is regenerated cellulose fiber produced from naturally occurring polymers.

• A good precursor material should have following characteristics.
  
  o Sufficient strength and handling properties so that it can hold together fibers during carbon fiber production process.
  o Should not melt during production process.
  o Should not be completely volatile, as it will drastically reduce yield of carbon fiber.
  o Carbon atoms should self-align in graphite structure during pyrolysis, as this will enhance fiber’s mechanical properties.
  o Inexpensive