Natural Kevlar

Silk is composed primarily of a protein called **Fibroin**. At the microscopic level, fibroin consists of tightly packed, flat "sheets" of proteins. These are called **Antiparallel Beta-Pleated Sheets**. These sheets are held together by a massive density of Hydrogen Bonds. Individually, a hydrogen bond is weak, but millions of them working together act like molecular "**Velcro**."

Flowy Armor

Between these crystalline "hard" sheets are amorphous, "stretchy" regions. This combination is what gives silk its unique profile: the crystals provide **tensile strength**, while the amorphous regions provide **elasticity**.

Balistic Properties

Historically, silk was used in early body armor. Because it is so strong, a silk vest could actually stop low-velocity black-powder bullets or arrows. Instead of the projectile piercing the skin and shattering bone, the silk would "catch" the bullet and pull it into the wound as an intact bag, making it much easier to remove and preventing infection.

The Shield of Brocade

Natural silk fibers are built like a high-tech cable, consisting of a core of strong protein threads called fibroin held together by a sticky, protective "glue" known as sericin. At the microscopic level, these fibroin threads are made of even smaller bundles of nanofibrils, where rigid crystals provide the strength while flexible chains allow for stretch. This unique combination of a "tough core" and a "shielding skin" is what allows silk to be incredibly lightweight yet stronger than steel by weight.

The Shield of Brocade

In the courts of Europe or the Edo period in Japan, wearing heavy Brocade wasn't just about fashion. The sheer cost of the textile signaled a level of invulnerability. Being draped in heavy silk Brocade, made its bearer physically and legally untouchable.

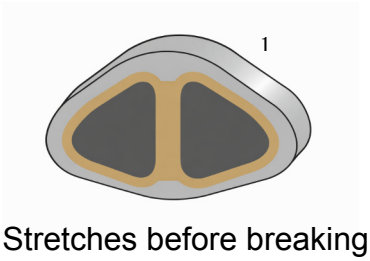
10-20 µm

3-5 µm

12 µm

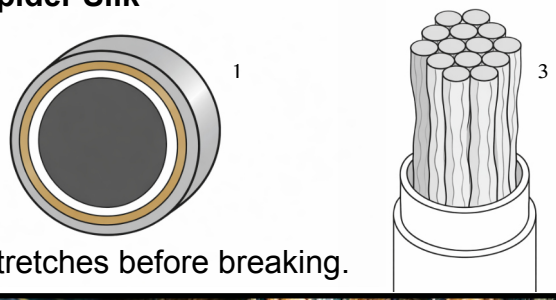
5-10 µm

Bombyx Mori (Silkworm) Silk



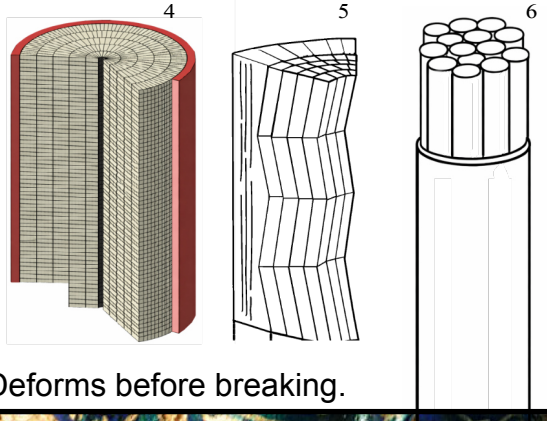
Stretches before breaking.

Spider Silk



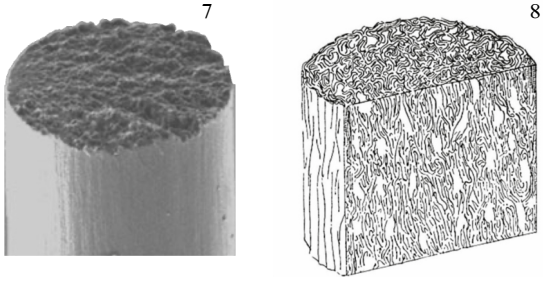
Stretches before breaking.

Kevlar



Deforms before breaking.

Carbon



Doesn't stretch or deform, shatters under impact.