Polymer Science and Modern Fibrous Armor
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Chemistry is critical to many if not most advances in materials, the things we buy and the changes in society that they create. Advances in such applied chemistry often requires careful understanding of the application and the route to commercial scale up. An example is highly oriented, high strength polymer fibers and fibrous sheets used in armor. Over the last half century, advances have allowed practical body armor that offers meaningful protection against pistols, fragments from bursting munitions, and rifles, even as those weapons have evolved and become more aggressive. Fibrous armor interacts with advancing projectiles as a system, and their performance depends on their chemistry, morphology, the fabric structures used, and the mechanics of impact. Further chemistry advances in highly oriented fibrous armor requires understanding these application needs. This lecture will discuss how fibrous body armor works, and the morphology and fabric structures needed for high performance.

Some historical references on the development of modern, fibrous body armor materials include: