

Lahore College for Women University Lahore



Lecture:15

Course: Nanotechnology & Nanostructures

Instructor: Dr. Zohra Kayani



Nanoproduct Forms

Nanoproduct Forms

- ❖ **Nanocoatings**
- ❖ **Multilayers and Nanofilms**
- **Nanoadhesives**
- **Nanoporous**


Coating

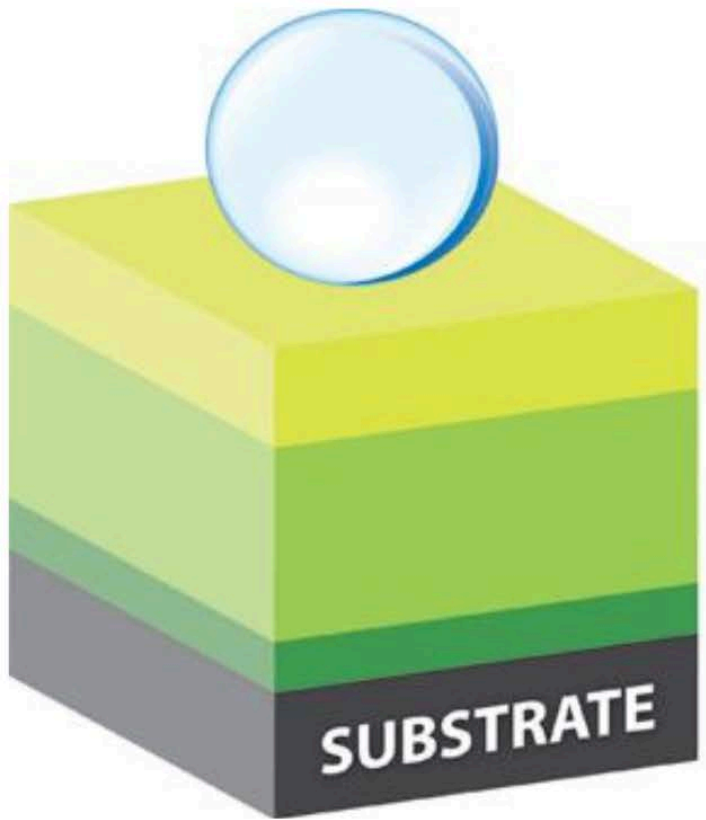


Nanocoatings

- Coatings are **thin coverings** that are deposited on a base material to enhance its **surface characteristics** or **appearance**.
- Coatings are used to improve **durability** or **wearing characteristics**, provide, or otherwise protect the base material “**corrosion resistance**”.



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- Nanocoatings are coatings that are produced by usage of some components at **nanoscale** to obtain desired properties.
 - They might also be used for **change adhesion qualities, color, reflective qualities**, or a host of other reasons

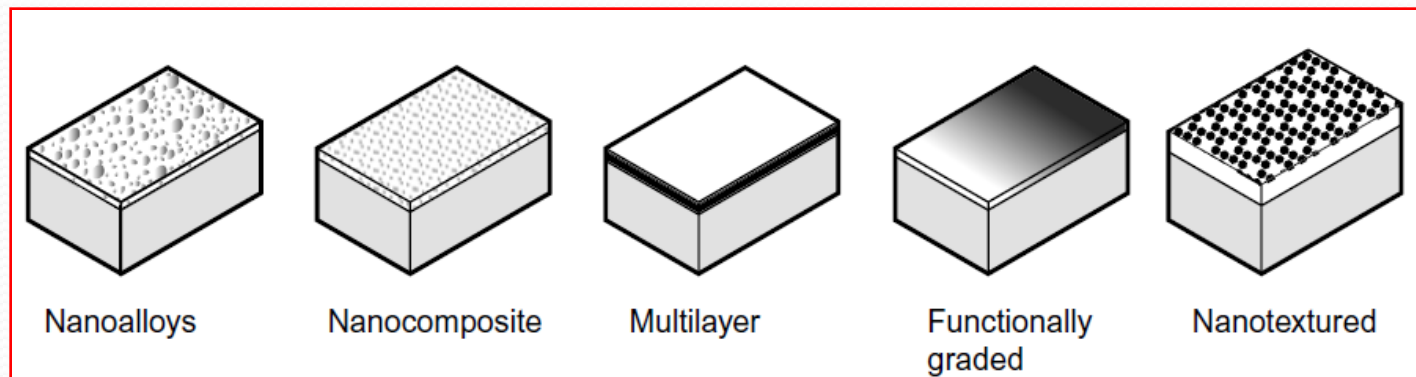


← The top surface is another nanocoating that imparts hydrophobicity, oleophobicity and chemical resistance

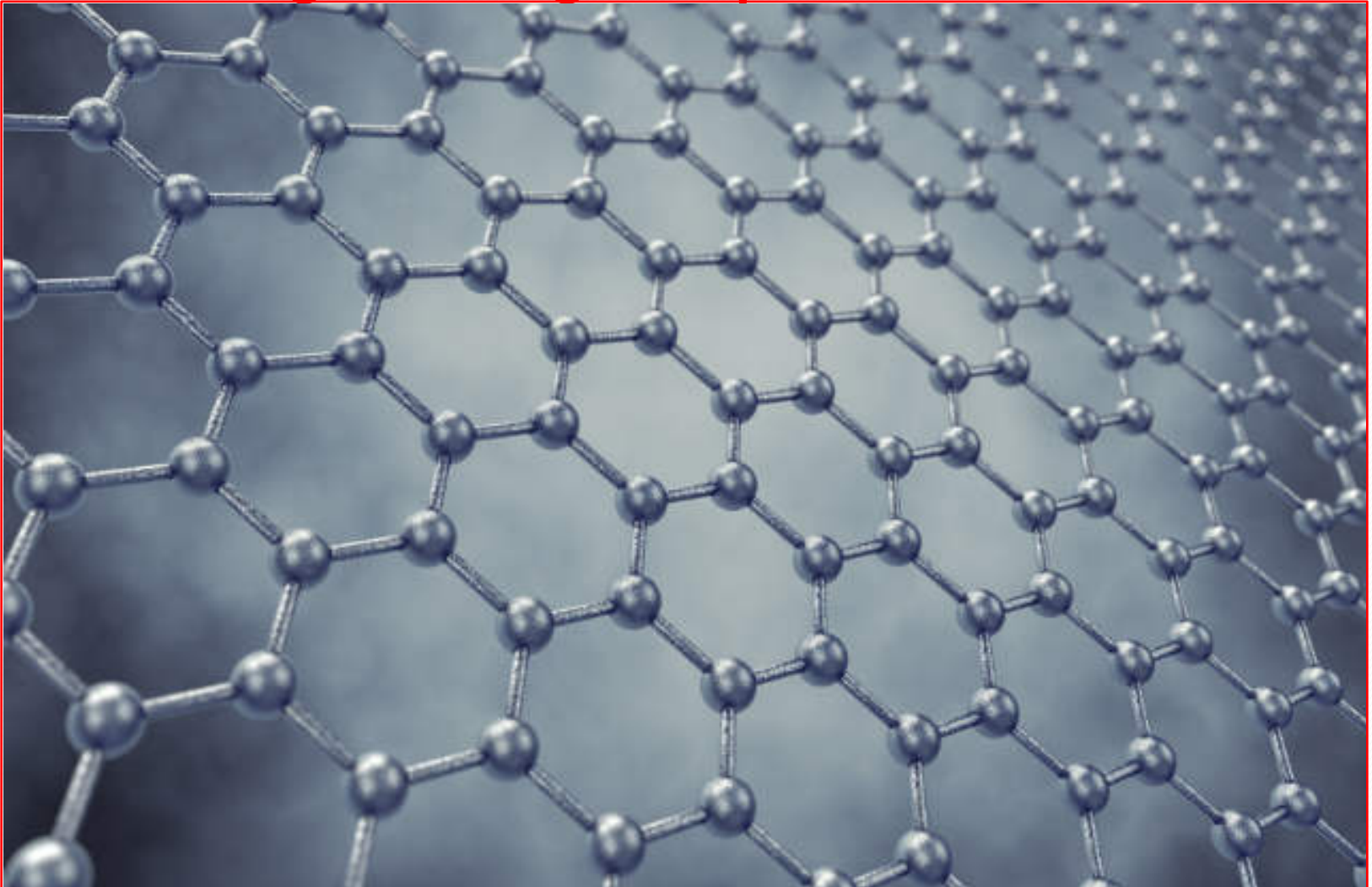
← Above the substrate surface is a ceramic layer that adds hardness, chemical resistance, electrical insulation, corrosion and scratch resistance

← At the substrate surface, NanoSlic has a nanocoating layer that chemically binds to the substrate

- Coatings are widely used because they provide a direct and cost-efficient way of imparting particular surface qualities to a material without having to alter the entire mass of the material. Nanocoatings and nano-based thin films are quite similar but “coatings” are **thicker** than films.

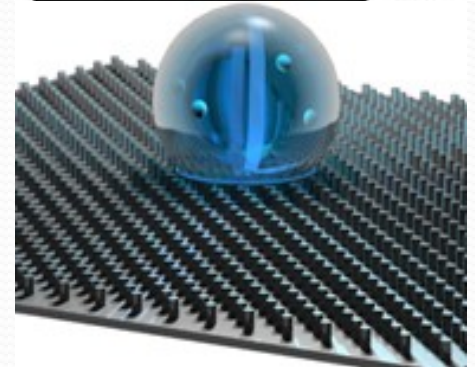
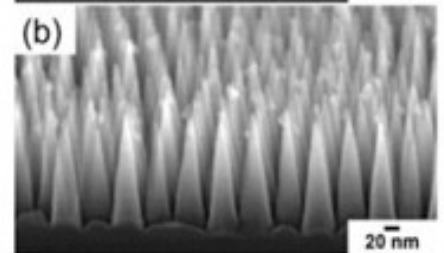
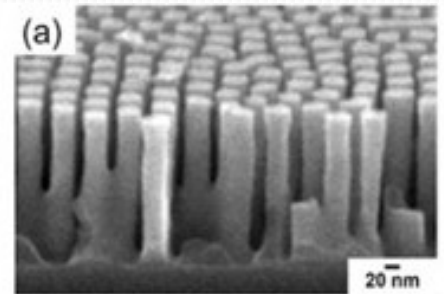


Nanoscale coatings of the 2D material **hexagonal boron nitride (h-BN)** have been shown to prevent materials from **oxidizing under high temperature conditions**



Super Hydrophobic Nanocoatings

- Super Hydrophobic Nanocoatings provide waterproofed surfaces to smartphones, computers, electronic devices and textiles. Increasing the contact angles of the surface helps repel water. Textured coatings such as cylinders or cones shows that air bubbles get trapped within the surface forcing the water to ball up into drops.



- Water Proof Nanocoatings work to shield the smart phone



Multilayers and Nanofilms

- **Nanoscale thin films** (nanofilms) can be deposited on the surface of another base material. **Multiple nanoscale layers** can be built up to form **multilayered or laminate structures**.
- Total thickness often lies in the **submicron range**. They are relatively easy to deposit on a surface and can impart many qualities to it.



Flexible solar cell

- They can be **conductive** or **nonconductive**.
- **Conductive layers** can be deposited on **nonconductive base materials**.
- Most of the attributes and characteristics of basic films are generally similar to those nanocoatings. For example, **thin carbon nanotube composites** have been layered on to many different base materials to alter their properties. **Multilayered structures** can be designed to **decrease overall surface reflections** or **improve surface brightness**.

Applications of Multilayers and Nanofilms

- Applications are found in flat-panel displays, touch panels, disk drives, and anti-reflection glasses.



Touch Panel Display

A **touch panel display** , is a both input and output device and normally layered on the top of an electronic visual display of an information processing system.

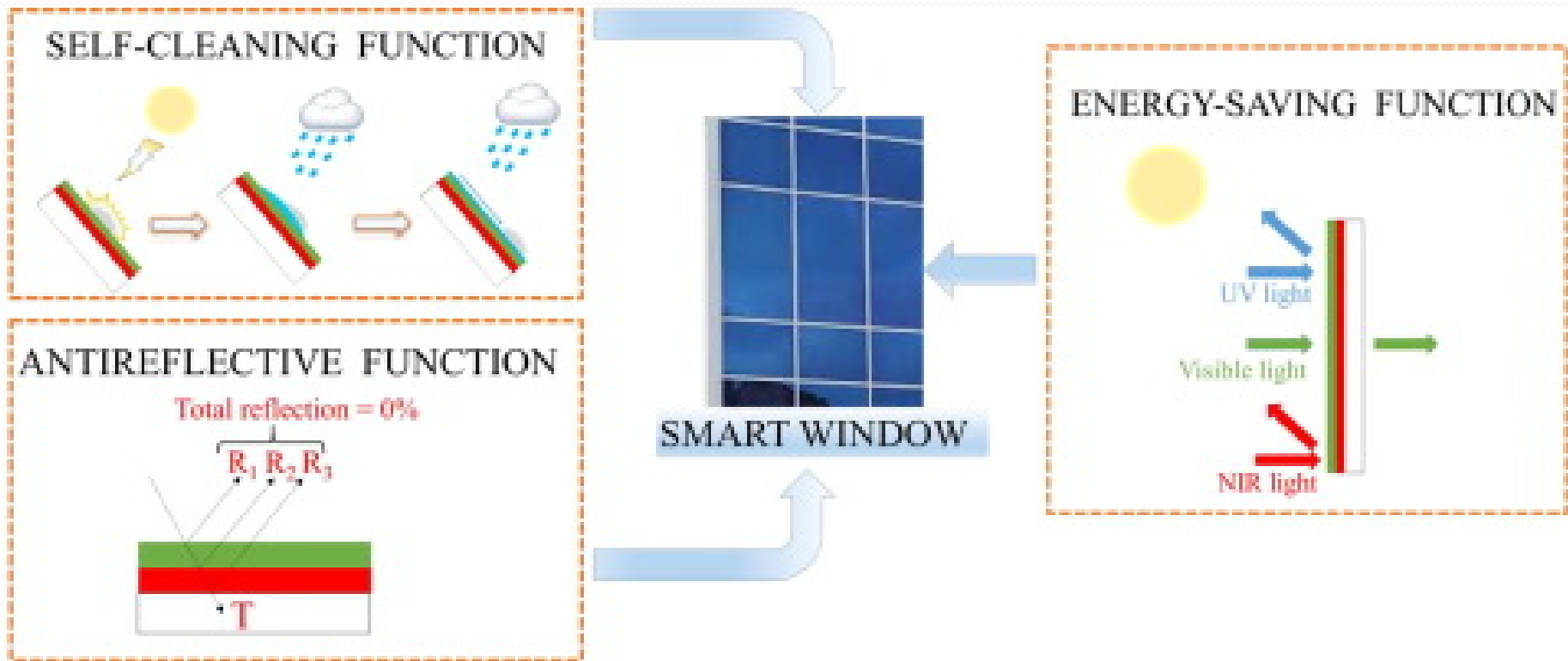


Anti blue ray glasses



They filter out the
harmful blue light

Multilayer thinfilm structures for multifunctional glass





Thank You