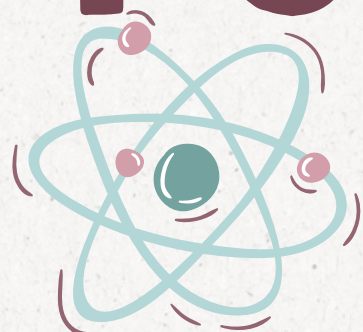
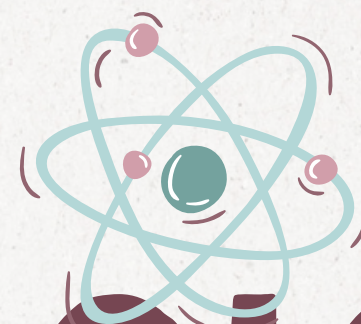
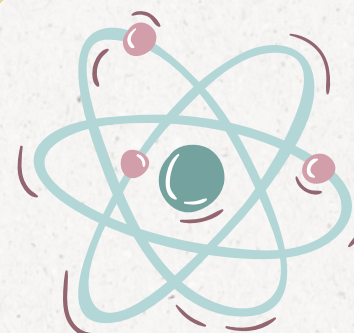
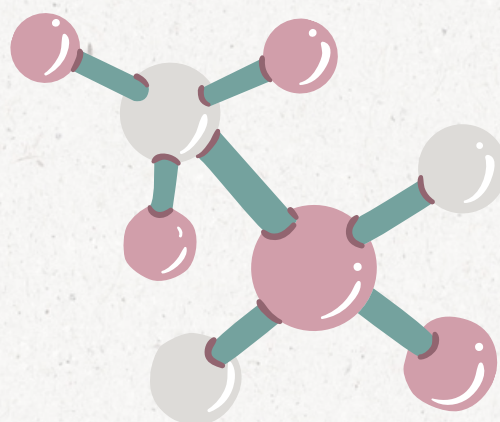


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PHOTOCATHALYSIS



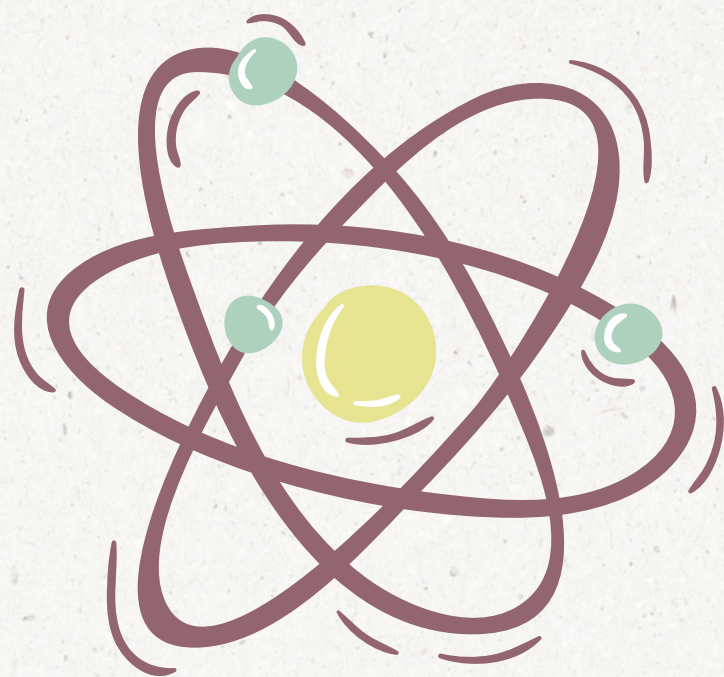
ANNA NIKOLISZYN
KRZYSZTOF PLUTA





INTRODUCTION

Photocatalysis is the process or activity that occurs by the interaction of a light source to the surface of a material (i.e., semiconductor materials). When this activity occurs, it is necessary that at least two reactions should take place simultaneously, oxidation reaction at with the help of photo-generated holes, and reduction reaction with the help of photo-generated electrons.





DEFINITIONS



ADSORPTION

Adsorption is a surface process that leads to transfer of a molecule from a fluid bulk to solid surface. This can occur because of physical forces or by chemical bonds. Usually it is reversible (the reverse process is called desorption); then it is responsible not only for a subtraction of substances but also for release.

EXFOLIATION

Because the layers bond to each other by relatively weak van der Waals forces, some layered materials are amenable to exfoliation, the complete separation of the layers of the material. Exfoliation can be done using sonication, mechanical, hydrothermal, electrochemical, laser-assisted, and microwave-assisted methods.

TiO₂

Titanium dioxide (TiO₂), which is one of the most basic materials in our daily life, has emerged as an excellent photocatalyst material for environmental purification. In this review, current progress in the area of TiO₂ photocatalysis, mainly photocatalytic air purification, sterilization and cancer therapy are discussed together with some fundamental aspects. TiO₂ exists in 3 allotropic variants anatase, brookite, rutile

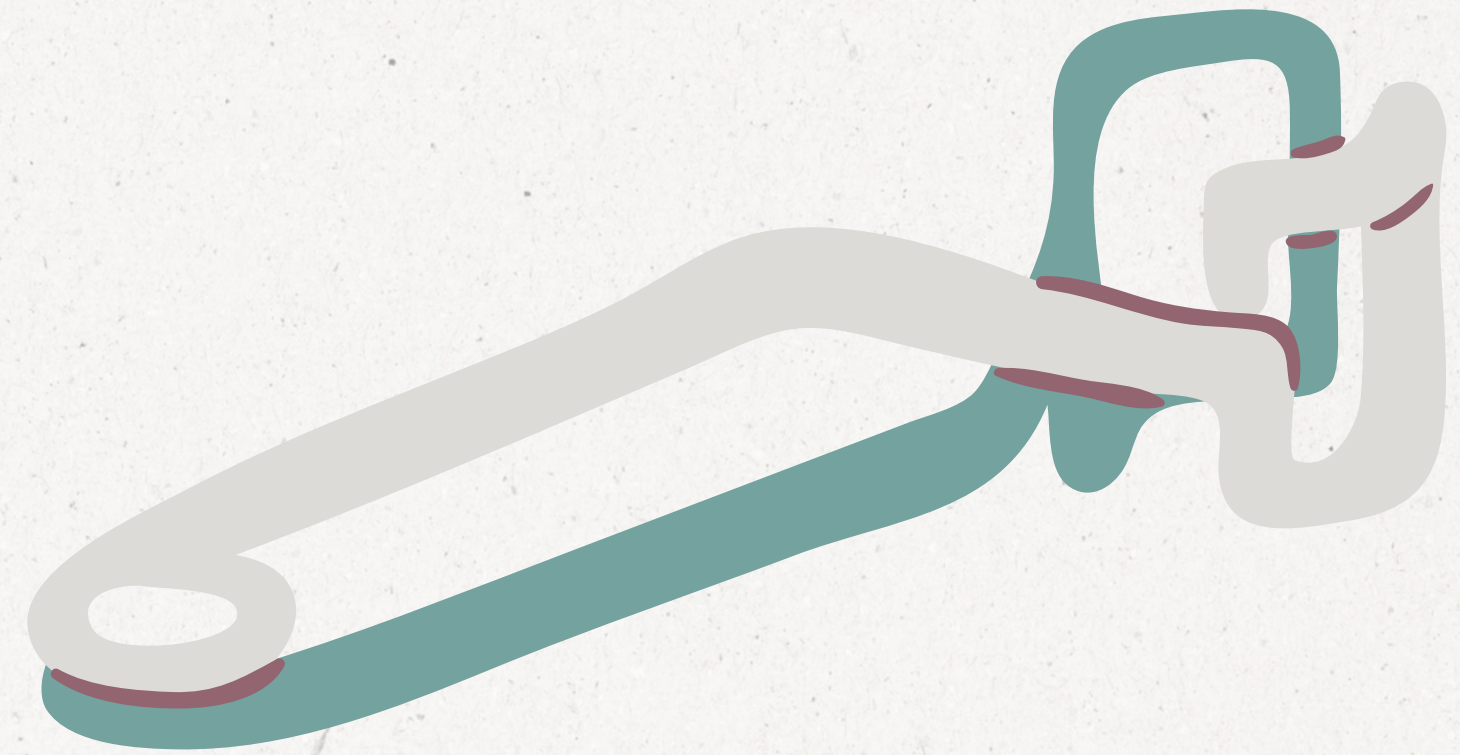
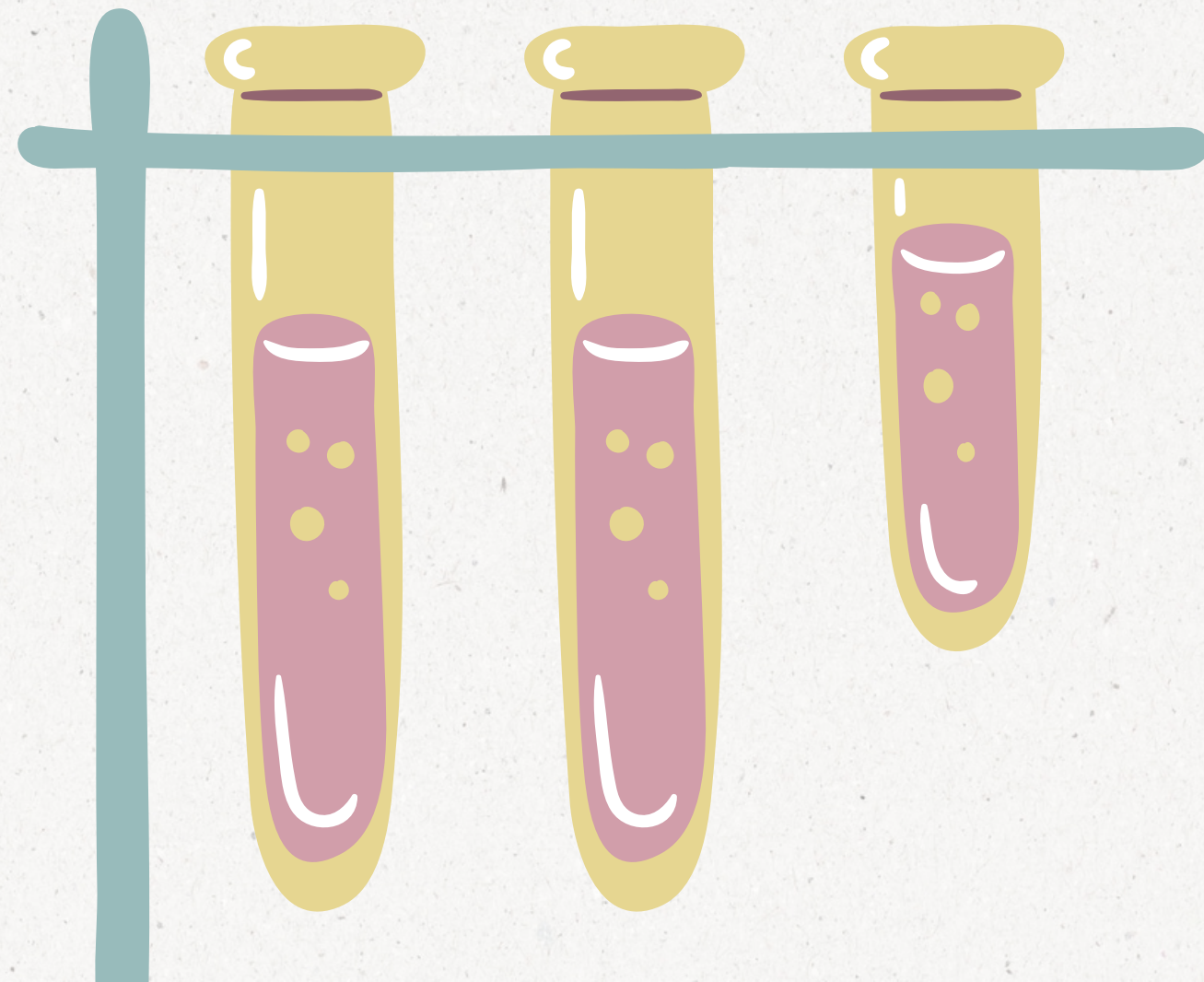


G-C₃N₄

The graphite-like carbon nitride (g-C₃N₄), as a metal-free polymer n-type semiconductor, possess many promising properties, such as unique electric, optical, structural and physiochemical properties, which make g-C₃N₄-based materials a new class of multifunctional nanoplatforms for electronic, catalytic and energy applications

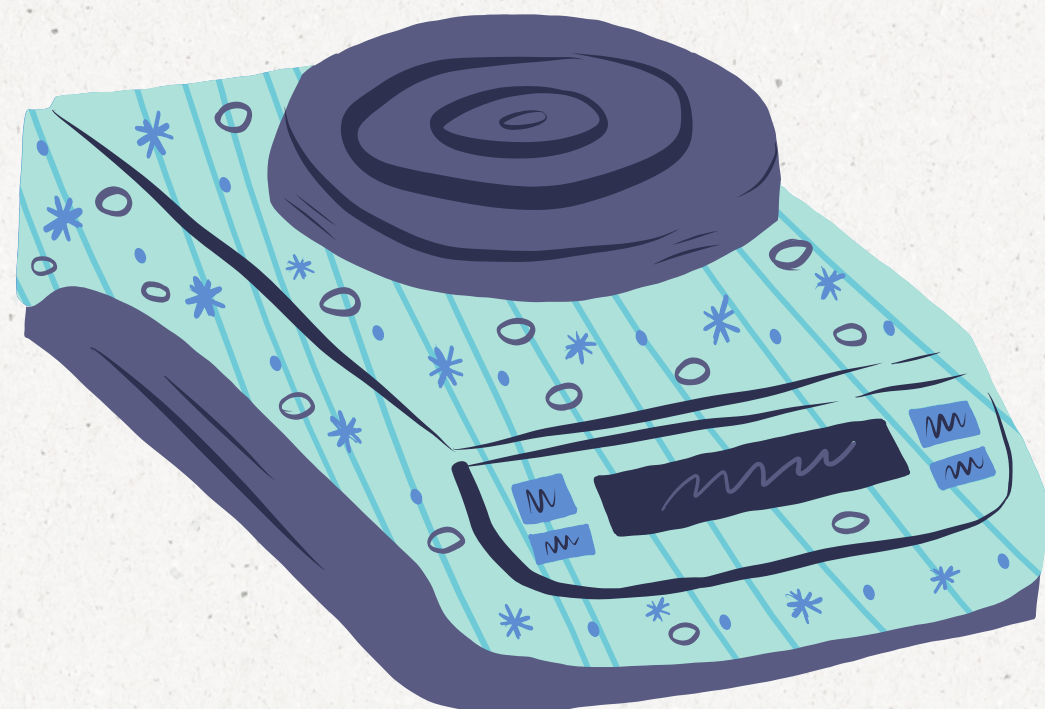
01 RHB SOLUTION

RhB - Rhodamine B is a green substance that dissolved in water make pink watercolor it is used as a fluorescent dye. Rhodamine B has its highest absorption point at wave length 553nm.

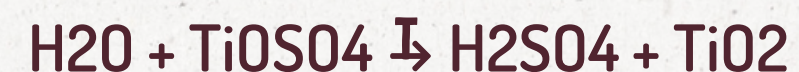


02 MELAMINE INTO G-C3N4

Its a thermal processing of the melamine in the muffle furnace . First the melamine turns into g-C3N4/M-bulk, then we are doing the exflotation of the g-C3N4/TEX again in the muffle furnace



03 TiO₂ HYDROLYSIS



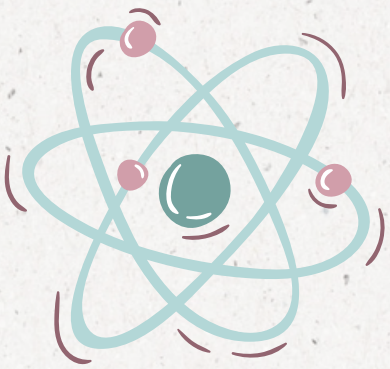
We mixing water with the Titanyl sulfate and heat up to about 100°C while mixing for 1 hour. Cool it down, filtrate under the preassure and dry it in the dryer.

04 X-RAY DIFFRACTION

A technique used in materials science to determine the crystallographic structure of a material. XRD works by irradiating a material with incident X-rays and then measuring the intensities and scattering angles of the X-rays that leave the material

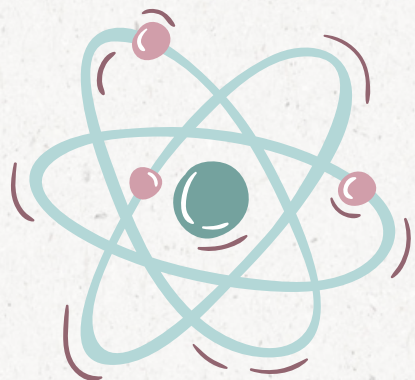


05 ELECTRON BAND GAP

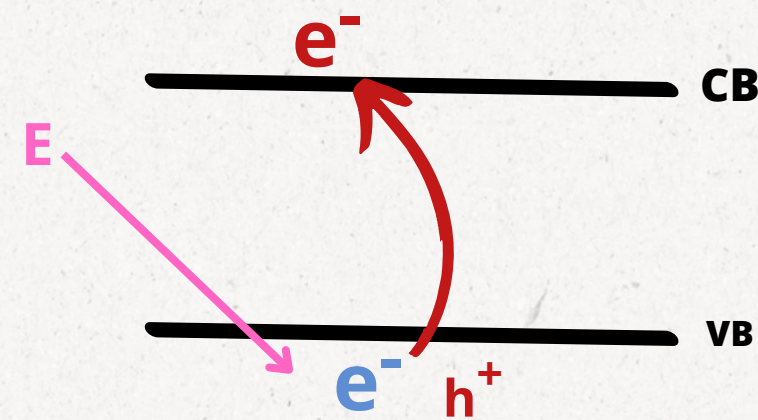


The band gap is the energy difference between the top of the valence band and the bottom of the conduction band in semiconductors. Every semiconductor has its own characteristic energy-band structure. This variation in band structure is responsible for the wide range of electrical characteristics observed in various materials.

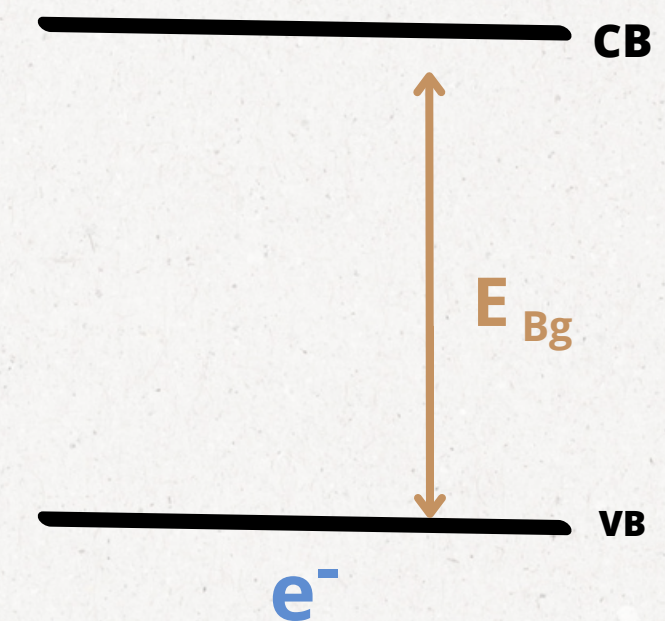
Electrons are able to jump from one band to another. However it requires a specific minimum amount of energy for the transition. Electrons can gain enough energy to jump to the conduction band by absorbing a photon



SEMICONDUCTORS

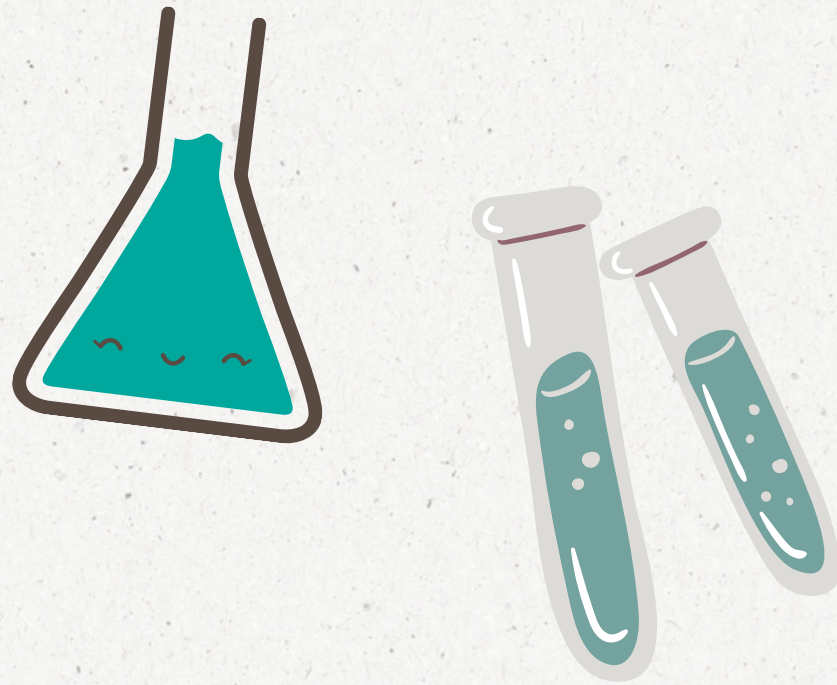


ISOLATORS



METALS



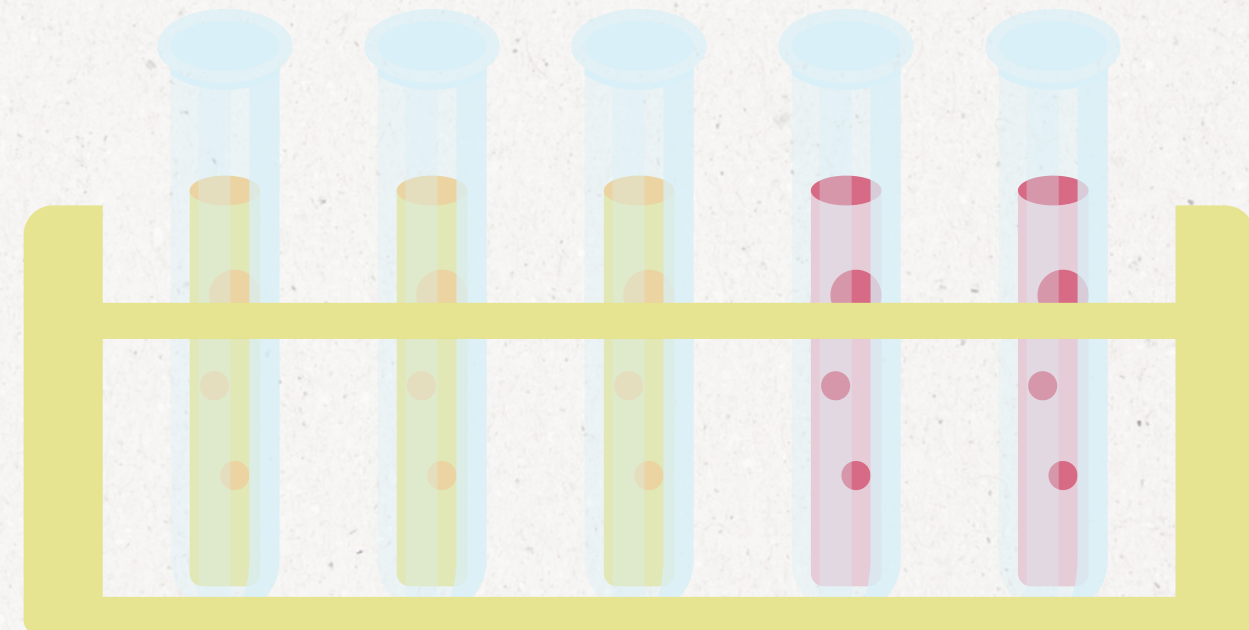


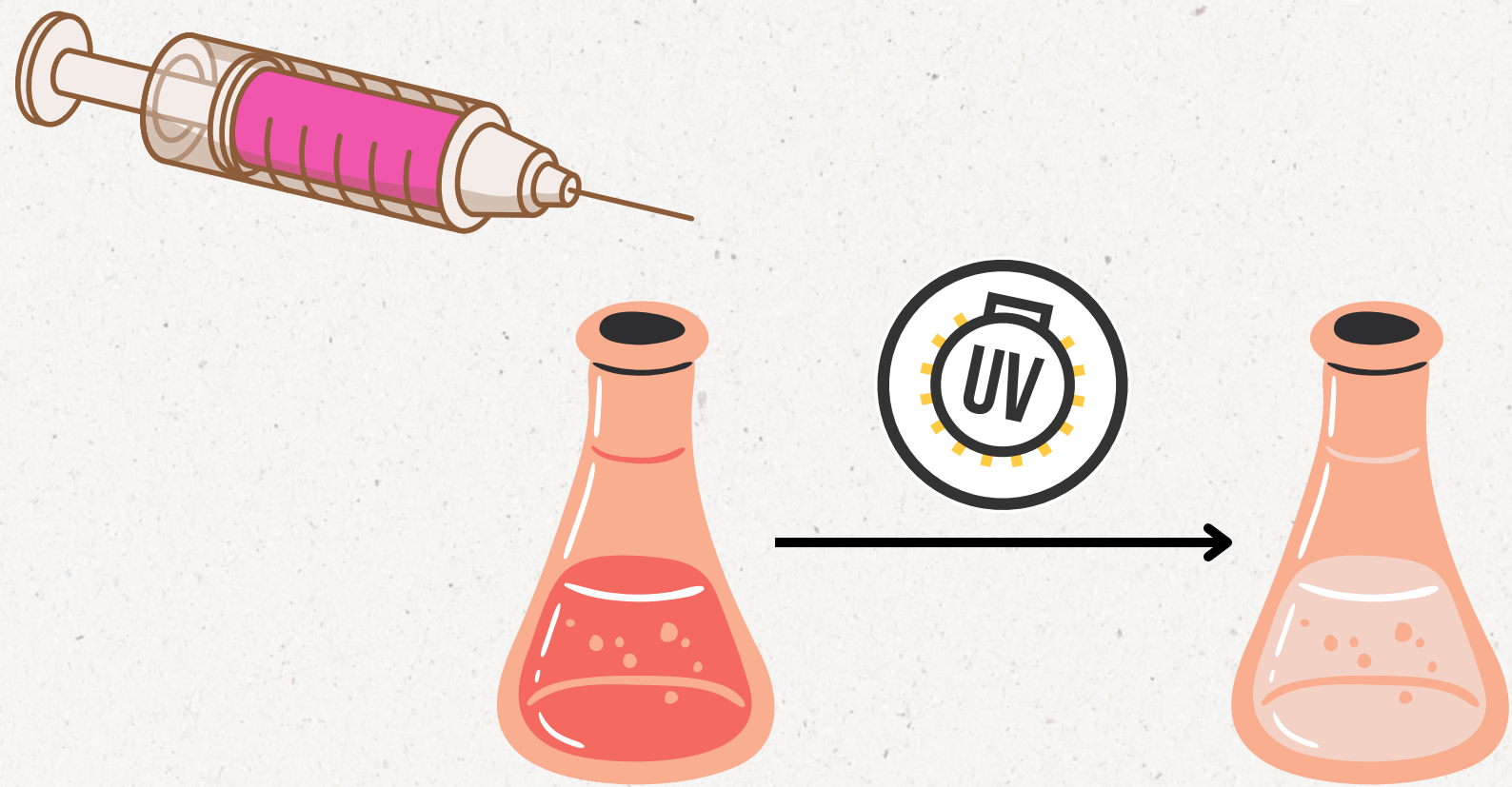
06 ZETA POTENCIAL

A beneficial indicator of the surface charge of particles and is directly associated with composition used for preparation. Laser Doppler anemometry method calculated the mean electrophoretic mobility of particles and quantified the particle charge. Zeta potential evaluation can assist to formulate innovative nanocarrier-based cosmetic products as it allows to estimate the concentration of the stabilizer used for the formulation of the nanoparticles along with other composition.

07 DYNAMIC LIGHT SCATTERING

A powerful, yet easy to use technique to measure the hydrodynamic size and related parameters of macromolecules and nanoparticles in solution, without the need for chromatographic separation



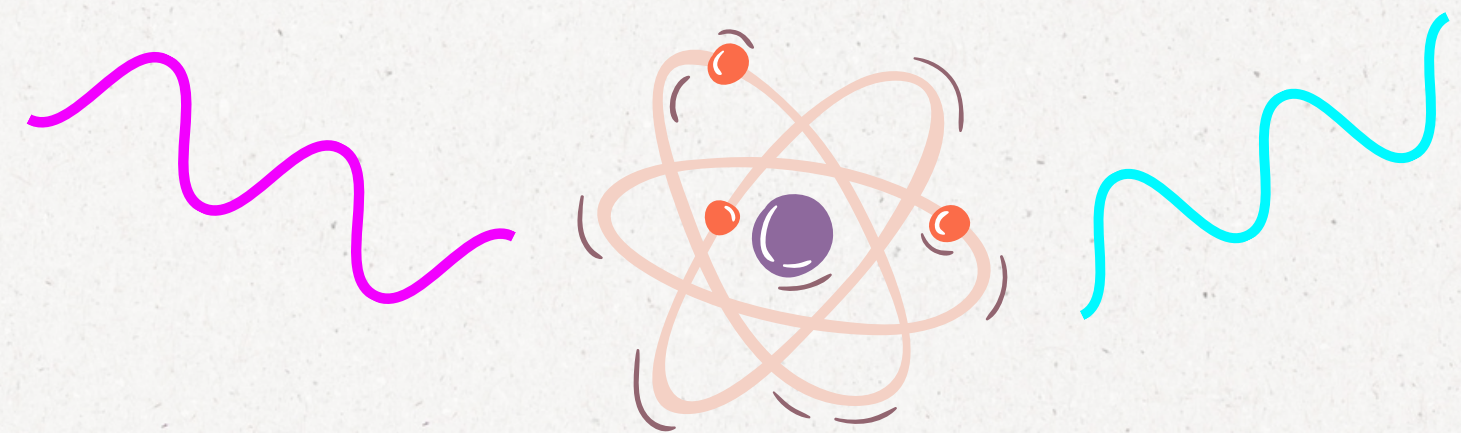


08 PHOTODEGRADATION

The alteration of materials by light. Commonly, the term is used loosely to refer to the combined action of sunlight and air, which cause oxidation and hydrolysis. Often photodegradation is intentionally avoided, since it destroys paintings and other artifacts. It is, however, partly responsible for remineralization of biomass and is used intentionally in some disinfection technologies. Photodegradation does not apply to how materials may be aged or degraded via infrared light or heat, but does include degradation in all of the ultraviolet light wavebands.

09 PHOTOLUMINESCENCE SPECTROSCOPY

Is when light energy, or photons, stimulate the emission of a photon from any matter. It is a non-contact, nondestructive method of probing materials. In essence, light is directed onto a sample, where it is absorbed and where a process called photo-excitation can occur. The photo-excitation causes the material to jump to a higher electronic state, and will then release energy, (photons) as it relaxes and returns to back to a lower energy level.



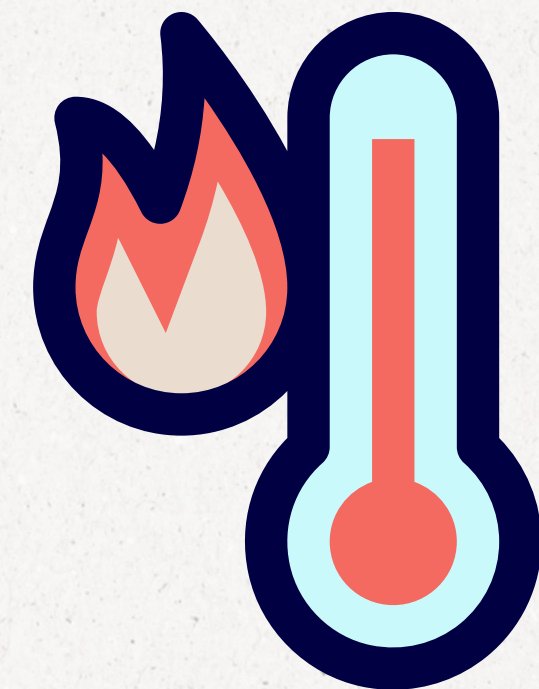


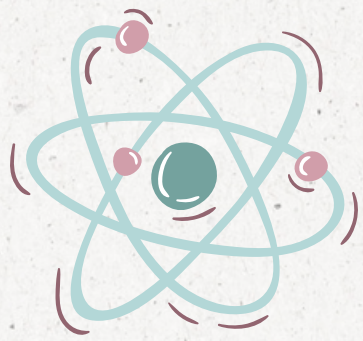
10 GAS PYCNOMETRY

A laboratory device used for measuring the density—or, more accurately, the volume—of solids, be they regularly shaped, porous or non-porous, monolithic, powdered, granular or in some way comminuted, employing some method of gas displacement and the volume:pressure relationship known as Boyle's Law. A gas pycnometer is also sometimes referred to as a helium pycnometer

11 THERMAL ANALYSIS- CALORIMETRY

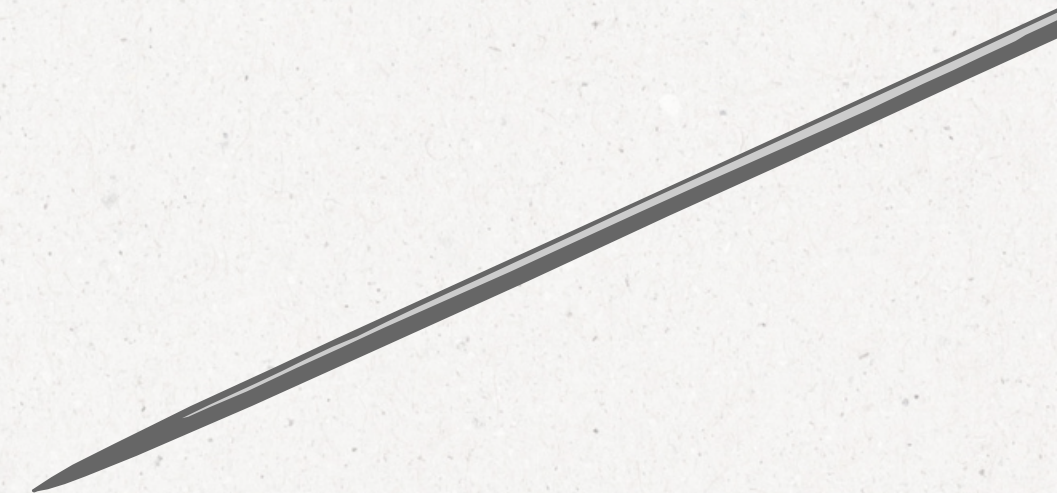
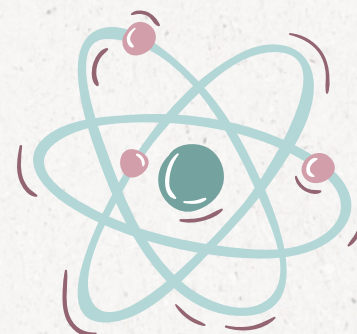
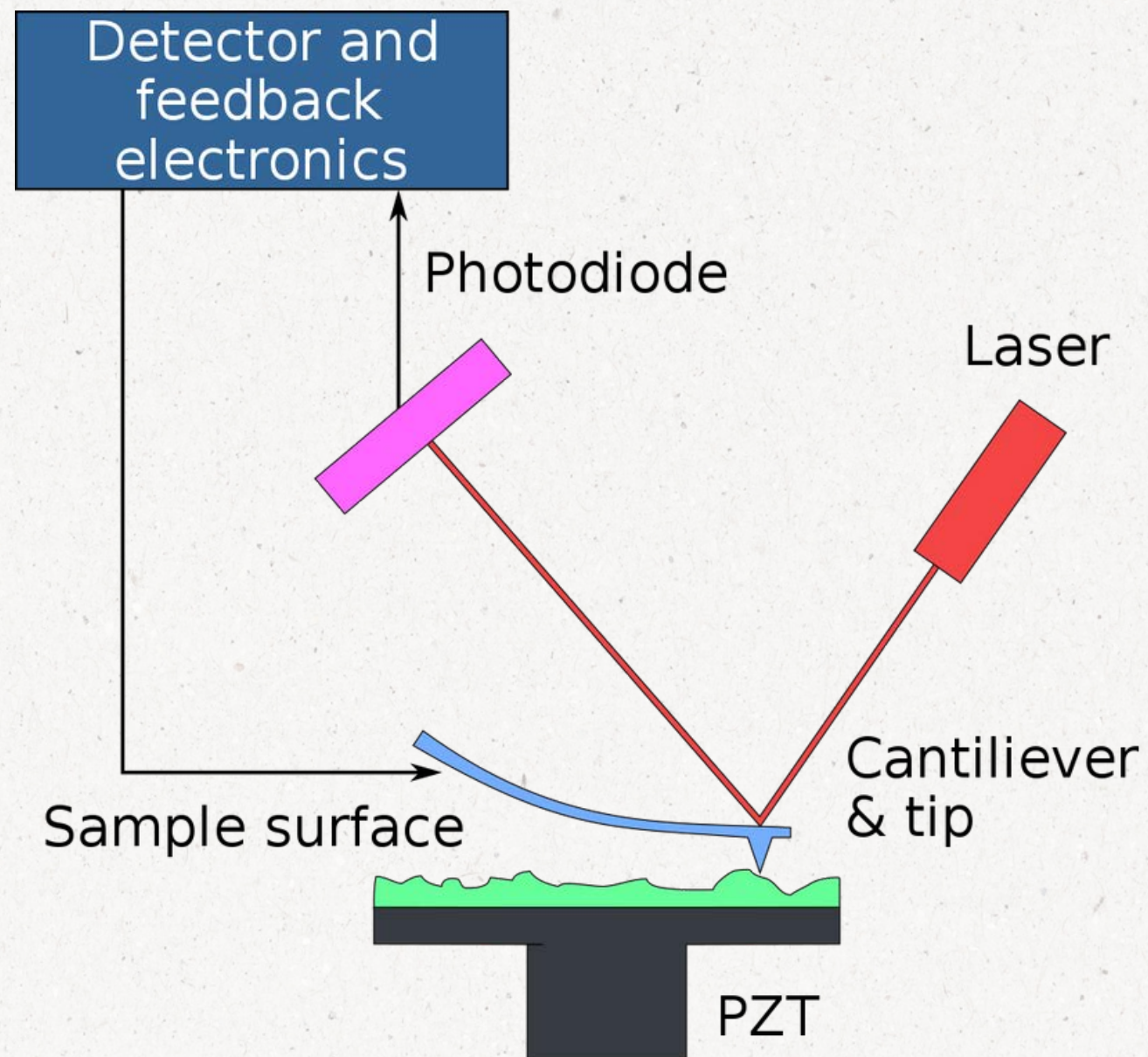
Thermal analysis refers to a variety of techniques in which a property of a sample is continuously measured as the sample is programmed through a predetermined temperature profile. Calorimetry is the act of measuring changes in state of a body for the purpose of deriving the heat transfer associated with changes of its state





12 ATOMIC FORCE MICROSCOPY

Atomic force microscopy is a type of scanning probe microscopy with demonstrated resolution on the order of fractions of a nanometer. The information is gathered by "feeling" or "touching" the surface with a mechanical probe. Piezoelectric elements that facilitate tiny but accurate and precise movements on (electronic) command enable precise scanning.





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THANK YOU!

Any questions? Don't hesitate to
ask for our help

