



TRINITY COLLEGE FOR WOMEN NAMAKKAL

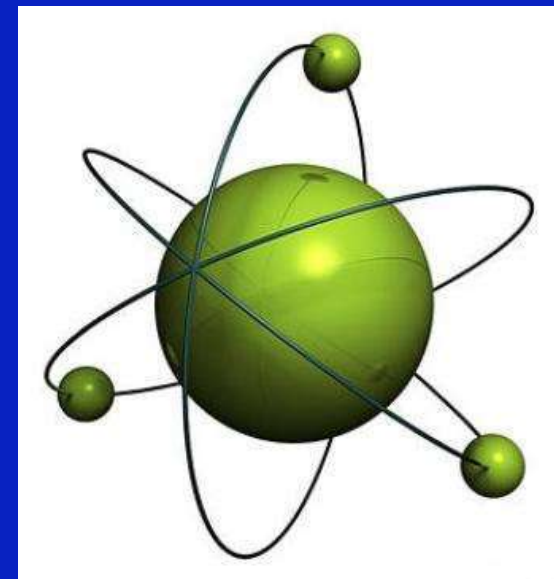
Department of Chemistry

NUCLEAR CHEMISTRY:

PRESENTED BY

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AP/CHEMISTRY



INTRODUCTION :

- ▶ **Nuclear Chemistry:**
- ▶ Nuclear Chemistry is sub discipline of chemistry. It is concerned with changes in the nucleus of atom. Nuclear changes are source of radioactivity & nuclear power.
- ▶ That's why nuclear chemistry is very important branch of chemistry.
- ▶ Atom of the element consists of three fundamental particles proton, electron and neutron which are called sub-atomic particles.

RADIOCHEMISTRY:

- ▶ Emission of subatomic particles or high-energy electromagnetic radiation by nuclei.
- ▶ Such atoms/isotopes said to be radioactive
- ▶ It is a spontaneous phenomena.
- ▶ We refer to these as radionuclide's.

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BETA DECAY:

- ▶ Lower ionizing power than alpha particle
- ▶ But higher penetration power
- ▶ Requires sheet of metal or thick piece of wood to arrest penetration
- ▶ More damage outside of body, but less in (alpha particle is opposite)

NUCLEAR FUSION:

- ▶ H-bonds utilize fusion (but needs high-temps to react because both positively charged).
- ▶ As does the sun: $2\text{H} + 3\text{H} \Rightarrow 4_2\text{He} + \text{n}$
- ▶ 10 x more energy/gram than fission
- ▶ Fusion would be a superior method of generating power.
- ▶ The good news is that the products of the reaction are not radioactive
- ▶ The bad news is that in order to achieve fusion, the material must be in the plasma state at several million Kelvin's.

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GAMMA RAY EMISSION:

- ▶ Electromagnetic radiation.
- ▶ High-energy photons
- ▶ No charge, no mass
- ▶ Usually emitted in conjunction with other radiation types
- ▶ Lowest ionizing power, highest penetrating power requires several inches lead shielding

APPLICATION OF NUCLEAR CHEMISTRY:

- ▶ Cancer Treatment – Cancer cells are more susceptible to radiation bc they are fast growing. Thyroid cancer can be treated with Ir-192 or Co-60.
- ▶ Food Preservation – Strawberries are exposed to Co-60. This kills most of the bacteria and mold on the food.

THANK YOU

<http://www.trinitycollegenkl.edu.in/>