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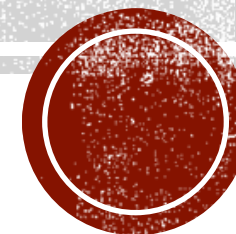
*Shaping Lives...
Empowering Communities!*

PRESENTATION ON

PROPELLANTS- SOLID (COMPOSITE), LIQUID (MONO AND BI), GAS TYPE. GUN PROPELLANTS (SINGLE, DOUBLE AND TRIPLE BASE) AND ROCKET PROPELLANTS.

CUFS 2416 EXPLOSIVE AND POST BLAST INVESTIGATION

B.Sc. Forensic Science (Sem 6)
School of Forensic Sciences
Bhubaneswar Campus



CONTENT

- Introduction to Propellants
- Types of Propellants
 - Solid (Composite)
 - Liquid (Mono and Bi)
 - Gas Type
- Gun Propellant
- Rocket Propellants

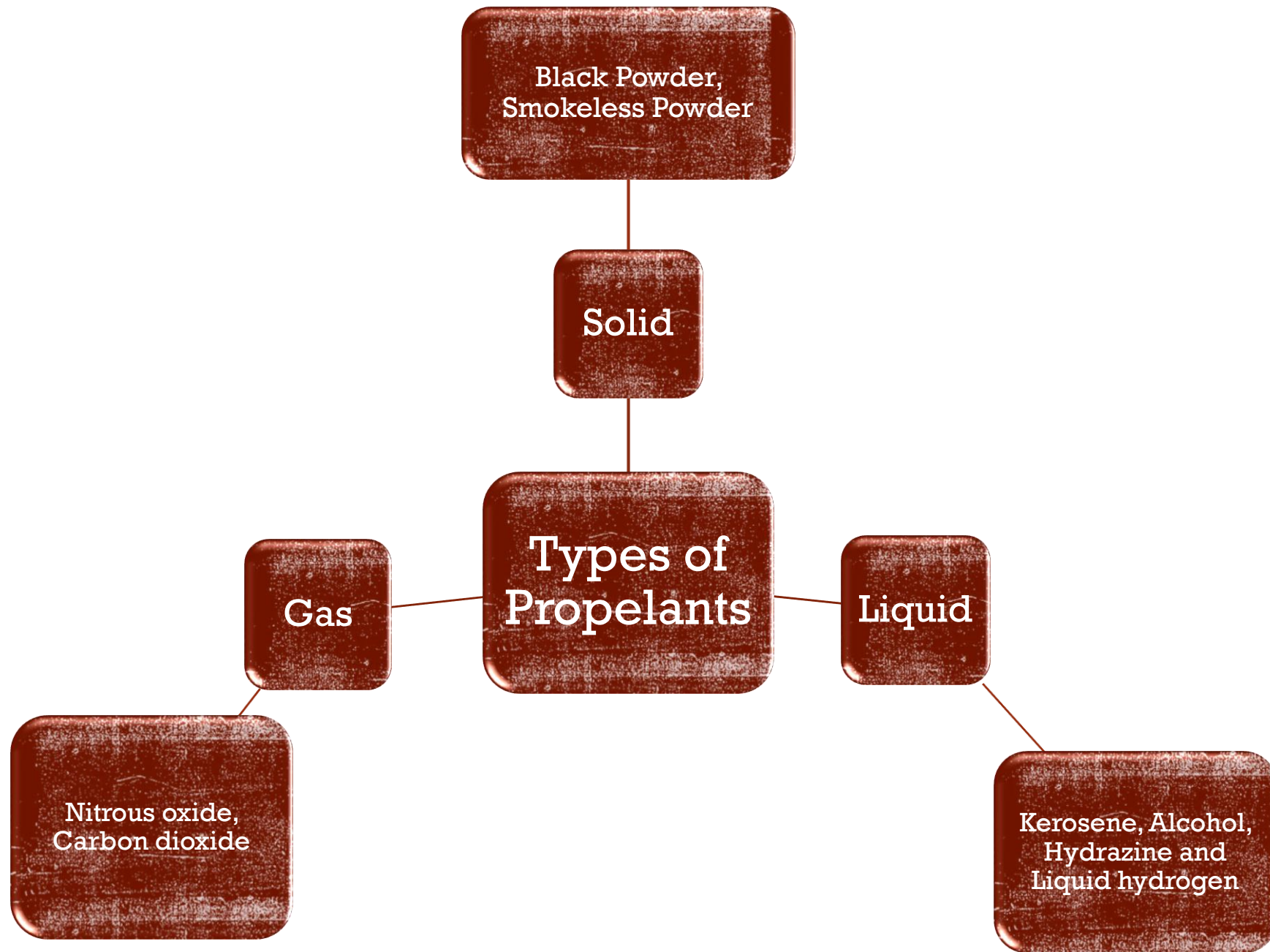


INTRODUCTION TO PROPELLANTS

Propellant are chemicals that are used for energy or pressurized gas production which are later utilized for creating fluid movement or for generating vehicle, projectile or another object propulsion.

Propellants are either burned or decompose for producing the propellant gas.





TYPES OF PROPELLANTS

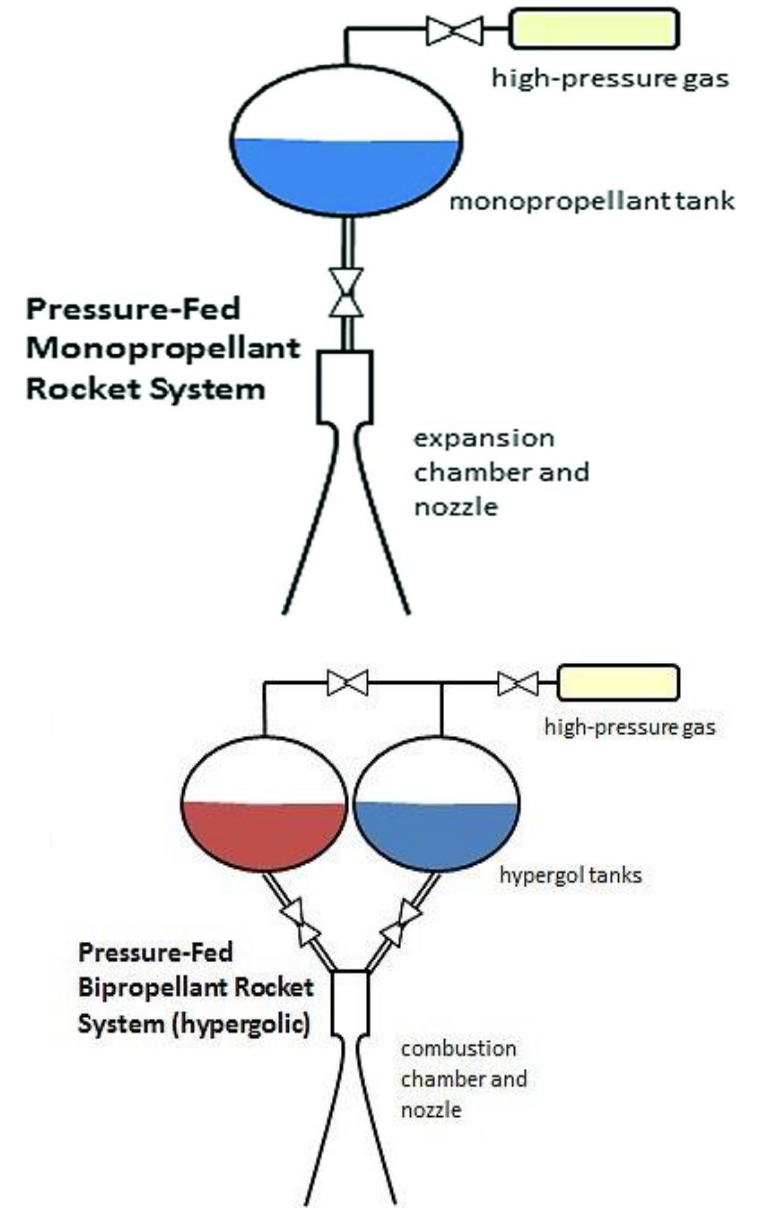
Solid (Composite)

- In a heterogeneous or composite propellant, the ingredients are physically mixed, leading to a heterogeneous physical structure. It is composed of crystalline particles acting as oxidizer and organic plastic fuels acting as binder to adhere oxidizer particles together.
- Solid propellants are mainly used in propulsion of gun and rocket. A solid propellant includes several ingredients such as oxidizers (often ammonium perchlorate), fuel (aluminum), binder (generally polyurethane or polybutadienes), plasticizer and other such agents.



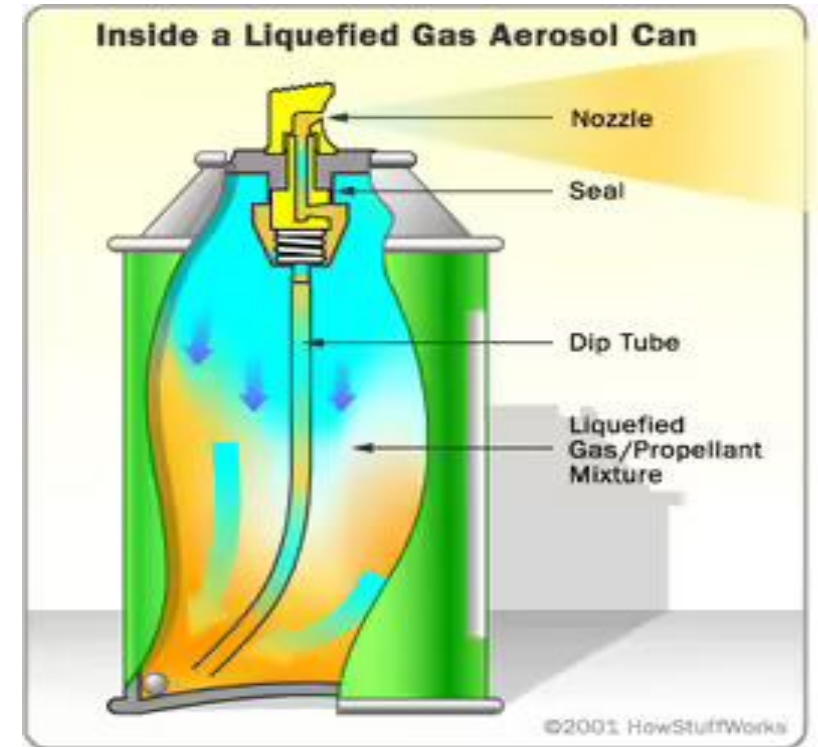
LIQUID

- Liquid propellant can be a fuel and an oxidizer. Generally, fuel include kerosene, alcohol, hydrazine and hydrogen. Typically, oxidizers include nitric acid, nitrogen tetroxide, liquid oxygen and fluorine. Liquid propellants of a single chemical (monopropellant) or two chemicals mixture (bipropellants).

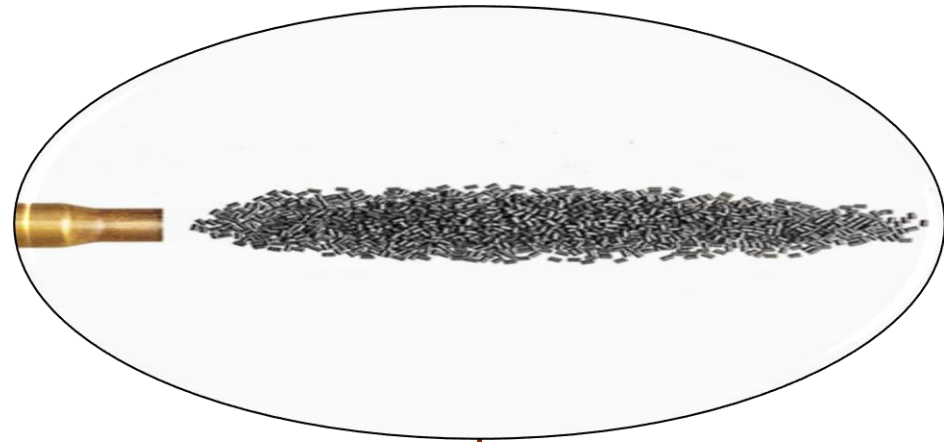


GAS

- A gas propellant usually involves some sort of compressed gas. These gas propellants we generally use in our day to day life as well as these are also used in many other fields such as in cryogenic rockets. Examples- Nitrous Oxide and Carbon di Oxide, Oxygen and Hydrogen, LPG, CNG etc.



GUN PROPELLANTS



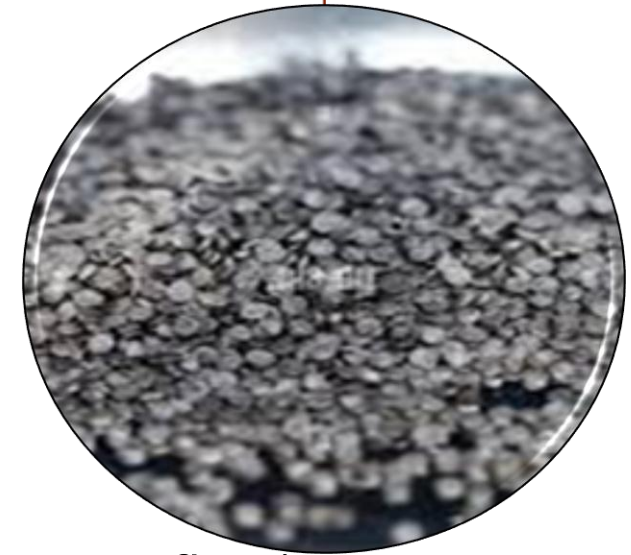
Gun Propellants



**Black
powder**



**Smokeless
powder**

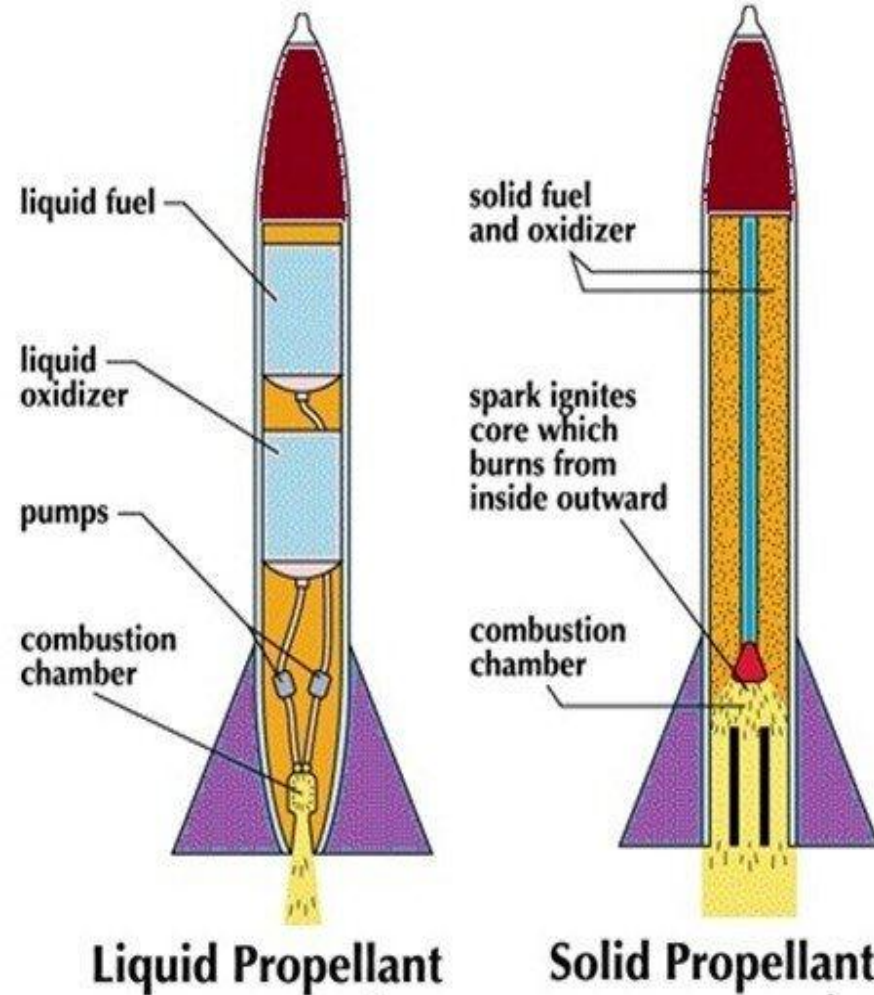


**Semi-
smokeless
powder**



ROCKET PROPELLANTS

The propellant is the chemical mixture burned to produce thrust in rockets and consists of a fuel and an oxidizer.



Liquid Propellants:

- In a liquid propellant rocket, the fuel and oxidizer are stored in separate tanks and are fed through a system of pipes, valves, and turbopumps to a combustion chamber where they are combined and burned to produce thrust.

Solid propellant:

- These are the simplest of all rocket designs. They consist of a casing, usually steel, filled with a mixture of solid compounds (fuel and oxidizer) that burn at a rapid rate, expelling hot gases from a nozzle to produce thrust. When ignited, a solid propellant burns from the center out towards the sides of the casing.

Hybrid propellant:

- These engines represent an intermediate group between solid and liquid propellant engines. One of the substances is solid, usually the fuel, while the other, usually the oxidizer, is liquid. The liquid is injected into the solid, whose fuel reservoir also serves as the combustion chamber.



THANK YOU

