Graphene Oxide (GO) is a layered material produced by oxidation of graphite. In contrast to pristine graphite, the Graphene Oxide is heavily oxygenated,bearing hydroxyl and epoxide functional groups on their basal planes, in addition to carbonyl and carboxyl groups located at the sheet edges. The presence of these functional groups makes graphene oxide strongly hydrophilic, which allows graphite oxide to readily swell and disperse in water. It is produced by oxidizing crystal graphite with a mixture of sulfuric acid, sodium nitrate, and potassium permanganate (the Hummers method). Graphene Oxide is a poor conductor but its treatment by heat, or chemical reduction can restore most properties of the famed pristine graphite.

Potential applications

- **Nanocomposites and GO Paper Materials**

Graphene Oxide mixes readily with many polymers, forming nanocomposites, and greatly enhances the properties of original polymer; this includes elastic modulus, tensilestrength, electrical conductivity, and thermal stability. In its solid form, Graphene Oxide flakes tend to attach one to another, forming thin and extremely stable paper-like structures that can be folded, wrinkled, and stretched.

- **Transparent Conductive Films**

Graphene oxide can be expected to be used is in the production of transparent conductive films. Graphene Oxide films can be deposited on essentially any substrate, and later converted into a conductor. Such coatings can be used in flexible electronics, solar cells, liquid crystal devices, chemical sensors, and as an indium tin-oxide (ITO) replacement. ITO is the current material of choice for touch screen devices.

- **Energy Related Materials**

Graphene Oxide and its reduced forms have an extremely high surface area; because of this, these materials are under consideration for usage as electrode material in batteries and double-layered capacitors, as well as in studies of hydrogen storage, fuel cells, and solar cells. Its ability to store hydrogen will, in the future, prove very useful for the storage of hydrogen fuel

in hybrid cars.

- **Applications in Biology and Medicine**

Graphene Oxide was found to be fluorescent, which opened a route for applications in bio-sensing, early disease detection, and even assisting in carrying cures for cancer. Graphene Oxide has been successfully used in fluorescent-based biosensors for the detection of DNA and proteins, with a promise of better diagnostics of HIV. Furthermore, Graphene Oxide is tested as a drug carrier as well.

- **Antibacterial Materials**

The growth of E. Coli bacteria may be suppressed when disrupted by Graphene Oxide. Because production of Graphene Oxide is inexpensive, it may be mass produced when its applications come to market. When this happens, it will open many doors for developing antibacterial materials, and may assist in healing wounds by killing bacteria that may affect them. These materials can be made into a thin paper used for packaging meats, which will prove more sanitary than current packaging methods.

- **Graphene Oxide Sheets at Interfaces**

Graphene Oxide's properties include the ability to act as a surfactant,similar to how soap or shampoo would make a stain disperse in water. This ability can be used as an agent fordispersion of insoluble materials such as carbon nanotubes.

Products:

- Single layer Graphene Oxide (175 ml)
- Single layer Graphene Oxide (1000 ml)
- Highly Concentrated Graphene Oxide (60 ml)
- Graphene Oxide Paper
- Highly Concentrated Graphene Oxide (1000 ml)
- PVP – Embedded Graphene Oxide 3%
- PVP – Embedded Graphene 3%