

**BLACK GOLD**

**Prelims:** Science and Technology- Newer Invention

**Mains:** GS-III- Science and Technology - developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and Developing New Technology

**Why in News?**

- ✚ Using gold nanoparticles Indian scientists have developed a new material called “black gold”, which can potentially be used for applications ranging from solar energy harvesting to desalinating seawater, according to a study.

**Black Gold:**

- ✚ To develop the material, the team from Mumbai-based Tata Institute of Fundamental Research (TIFR) rearranged size and gaps between gold nanoparticles.
- ✚ It has unique properties such as capacity to absorb light and carbon dioxide (CO<sub>2</sub>).
- ✚ Gold does not have these properties therefore ‘black gold’ is being called a new material.
- ✚ In appearance it is black, hence the name ‘black gold’, according to the findings published in Chemical Science. The researchers varied inter-particle distance between gold nanoparticles using a cycle-by-cycle growth approach by optimizing the nucleation-growth step. They used dendritic fibrous nano silica; whose fibres were used as the deposition site for Gold Nanoparticles.

**Features of Black Gold:**

- ✚ One of the most fascinating properties of the new material is its ability to absorb the entire visible and near-infrared region of solar light.
- ✚ It does so because of inter-particle plasmonic coupling as well as heterogeneity in nanoparticles size. Black gold could also act as a catalyst and could convert CO<sub>2</sub> into methane at atmospheric pressure and temperature using solar energy.
- ✚ If we develop an artificial tree with leaves made out of black gold, it can perform artificial photosynthesis, capturing carbon dioxide and converting it into fuel and other useful chemicals. The efficiency of conversion of CO<sub>2</sub> into fuel, at present, is low but researchers believe it could be improved in future. The material can be used as a nano-heater to convert seawater into potable water with good efficiency, the researchers said.