

Lab-Grown Diamonds

May 19, 2024 • vajiramandravi.com



About Lab-Grown Diamonds

- Laboratory-grown diamonds have essentially the **same chemical, optical, and physical properties** and **crystal structure as natural diamonds**.
 - Like natural diamonds, they are **made of tightly-bonded carbon atoms**.
 - They **respond to light in the same way** and are just as **hard as natural diamonds**.
- The **main differences** between laboratory-grown and natural diamonds **lie in their origin**.
- **Lab-grown diamonds** are diamonds that are **produced using specific technology** which **mimics the geological processes that grow natural diamonds**.
- The diamond simulants such as Moissanite, Cubic Zirconia (CZ), White Sapphire, YAG, and others are used to make them look like natural diamonds.
- **How are LGDs produced?** There are multiple ways in **which LGDs can be produced**.
- **High pressure, high temperature” (HPHT) method:**
 - It is the **most common** and **cheapest** method.
 - This method **mimics the conditions** under which **natural diamonds are formed** inside the earth.
 - To produce the lab diamond, a **large machine is fed** a certain amount of **carbon materials that it then crushes under pressures** of more than 870,000 lbs. per square inch **at extreme**

temperatures ranging from 1300 – 1600 degrees Celsius.

- **Lower-quality diamonds**, whether natural or laboratory-grown, **can also be put through the HPHT process to improve color**. This process can also be **used to change the color of diamonds** to pink, blue or yellow.

- **Chemical Vapor Deposition (CVD):**

- This technique enables scientists to grow laboratory-grown diamonds **using moderate temperatures (700°C to 1300°C) and lower pressures**.
- **Carbon-containing gas is pumped into a vacuum chamber and deposits onto a diamond seed, crystallizing** as laboratory-grown diamond.
- The **eventual size** of the diamond **depends on the time** allowed for growth.

- **Application of Lab-grown diamonds:**

- Used for industrial purposes, **in machines and tools** and their hardness and extra strength make them ideal for **use as cutters**.
- Pure synthetic diamonds are used **in electronics as a heat spreader** for high-power laser diodes, laser arrays and high-power transistors.

- **India** produces more than three million lab-grown diamonds a year and **accounts for 15 per cent of global production**.
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Q1: What is Carbon?

It is a very abundant element. It exists in pure or nearly pure forms – such as diamonds and graphite – but can also combine with other elements to form molecules.

Source: [Will the sparkle of India's lab-grown diamonds last forever?](#)

Source: <https://vajiramandravi.com/current-affairs/lab-grown-diamond/>

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