How to Make Diamonds

"The process works by placing a tiny fragment of **diamond** (called a carbon seed) into a microwave along with varying amounts of a carbon-heavy gas - methane is most commonly used. The gas mixture is heated to very high temperatures in the microwave to produce a plasma ball, and inside this, the gas breaks down and the carbon atoms crystallise and accumulate on the diamond seed, causing it to grow.

"The process can take up to 10 weeks to produce a marketable diamond, but it works so well, experts reportedly need a machine to tell the lab-grown gems apart from natural ones sourced from mines or riverbeds."
http://www.sciencealert.com/here-s-how-you-can-make-perfect-diamonds-in-the-microwave

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Diamonds can now be made in the lab entirely from scratch in just 15 minutes — and at room temperature: This new method challenges traditional techniques that mimic the extreme conditions under which diamonds naturally form deep within the Earth's mantle.
Typically, diamonds are created around 90 to 150 miles below the surface, where temperatures reach a scorching 2,000 degrees Fahrenheit and pressures are immense.
These conditions force carbon atoms to bond in a unique crystal structure, forming the coveted gemstones. Natural diamonds are brought closer to the Earth's surface through volcanic eruptions, where they are found in kimberlite or lamproite rocks. To replicate these natural conditions, scientists have been using the high-pressure, high-temperature growth method, simulating extreme conditions to transform dissolved carbon in liquid metals into diamonds around a starter gem. The new method involves using electrically heated gallium with a touch of silicon in a graphite crucible. Gallium was chosen for its ability to catalyze the formation of graphene, a carbon-based material similar to diamond. The team also created a special chamber with a 2.4-gallon crucible to hold the gallium-silicon mixture, allowing for experiments at sea-level atmospheric pressure in just 15 minutes. After numerous trials, the scientists discovered that a mixture of gallium-nickel-iron with a small amount of silicon effectively catalyzed diamond growth. Remarkably, diamonds appeared at the base of the crucible within 15 minutes, and a complete diamond film formed within two and a half hours.

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Carbon
Crystallization