

Offering Bespoke Services and Extraordinary Learning Experiences



South China Morning Post Innovation (/technology/innovation) / DIAMONDS (/frontpage/international)

CHINA (/NEWS/CHINA) HK (/NEWS/HONG-KONG) ASIA (/NEWS/ASIA) WORLD (/NEWS/WORLD) COMMENT (/COMMENT) BUSINESS (/BUSINESS) TECH (/TECHNOLOGY) LIFE LIFESTYLE CULTURE

Business Insider

SPORT (/SPORT) WEEK IN ASIA (/THISWEEKINASIA) POST MAG (/MAGAZINES/POST-MAGAZINE) STYLE (/MAGAZINES/STYLE) .TV (/VIDEO)

(/topics/business-insider)

844 SHARES



NOW READING

Here's how scientists grow perfect diamonds in the lab

Here's how scientists grow perfect diamonds in the lab

Synthetic diamonds provide an alternative for those who question the ethical practices and environmental impact from mining naturally forged stones

PUBLISHED : Tuesday, 18 October, 2016, 2:04pm

UPDATED : Tuesday, 18 October, 2016, 4:13pm



BUSINESS INSIDER

Business Insider (/author/business-insider)

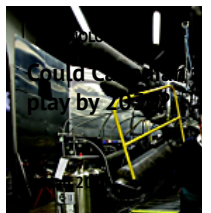
Real, or natural, in the vernacular of diamonds, isn't always better.

While the spectre of conflict and "blood" diamonds have largely faded in recent years thanks to ethical mining practices, international monitoring, and improved certification, diamond mines still leave big holes in the ground and pose a threat to the environment.

Synthetic diamonds are marketed as a solution to customers who are turned off by natural diamonds, all while providing pristine product – and typically priced at 15 per cent to 30 per cent less than similar, naturally forged stones.

Advertisement for Google with text: 廣告 - 馬上 NT \$ 150, google.com.tw, 提高企業在Google, 銷, 無分國界。需, 議? 立

We recommend for



844 SHARES



RELATED TOPICS

Business Insider (/topics/business-insider)

That's partly why a friend of mine, as he relayed in a recent story for Popular Science, proposed to his future wife with a lab-grown diamond.

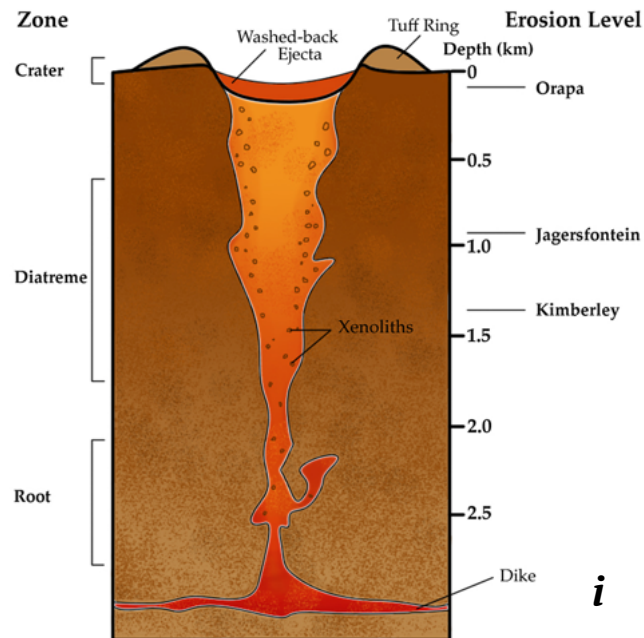
Here's how natural and synthetic diamonds differ, where and how they're grown, and the amazing variety of places they're found beyond the jewellery store.

Natural diamonds start out as carbon trapped in hunks of rock, called xenoliths, some 100 miles below the Earth's surface.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/c576c946-94f5-11e6-89e7-0e47003bc2df_image_hires.png)

Xenoliths must "cook" at about 2,000 degrees Fahrenheit then ride a spurt of lava to the surface, where the carbon can cool into diamonds at the edges of a carrot-shaped tube.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/ded6253a-94f5-11e6-89e7-0e47003bc2df_image_hires.png)

Source: LiveScience.com

This is why commercial diamond mines are usually conical pits: Workers excavate walls of minerals (often kimberlite) hunting for diamond-containing xenoliths.



TECHNOLOGY



TECHNOLOGY



TECHNOLOGY



TECHNOLOGY

Recommended by

MOST POPULAR

VIEWED | SHARED

1

(/lifestyle/artic thrive-behind- more-hong-kc Why start-ups i China's Great F Hong Kong (/lifestyle/artic start-ups-thrive chinas-great-fi hong-kong-its)

2

(/lifestyle/artic start-optimist: culture-immat Hong Kong's st focus at Startm (/lifestyle/artic kong-start-opti others-who-say immature-lock

3

(/news/china/e 2016-growth-t Shenzhen beats business flight (/news/china/e beats-2016-gro business)

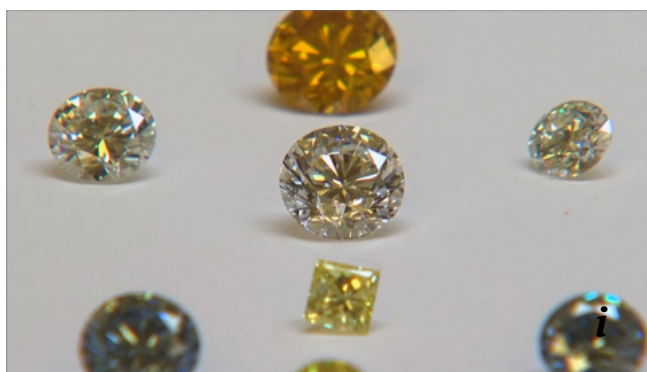
4

(/tech/article/
passwords-20:
you'd-expect)
2016's most co
passwords are e
you'd expect
(/tech/article/2/
common-passw
are-exactly-wh
expect)



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/f5073768-94f5-11e6-89e7-0e47003bc2df_image_hires.png)

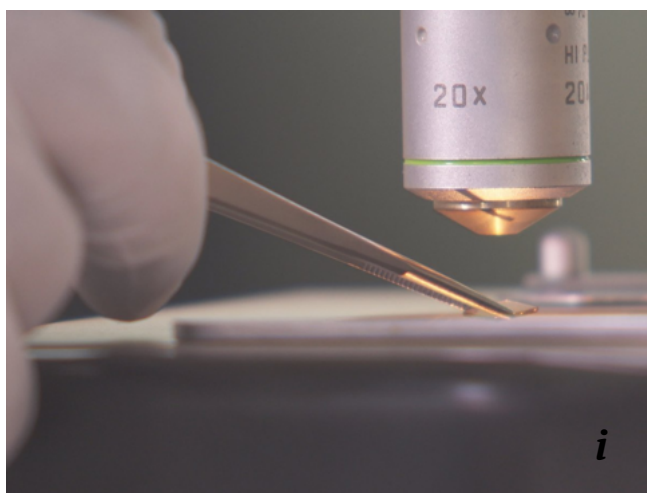
But beautiful diamonds do not need to be intensively dug out of billion-year-old lava pipes. Since 1954, diamonds have been grown inside laboratories in a variety of colours and purities.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/15c2d16a-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

Source: Popular Science

For growing gemstones, the most popular method is called chemical vapour deposition (CVD), which starts out with a tiny diamond "seed."



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/3154dfc-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

5

(/business/com
move-markets
new)
New app gives i
Trump's tweets
(/business/com
tweets-move-n
fair-warning-n



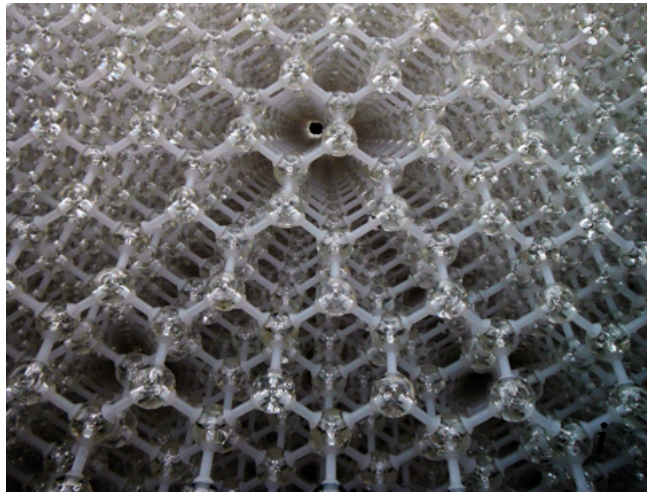
PROMOTIONS (



(/promotion/2040540/regi
essentials-2017-now)

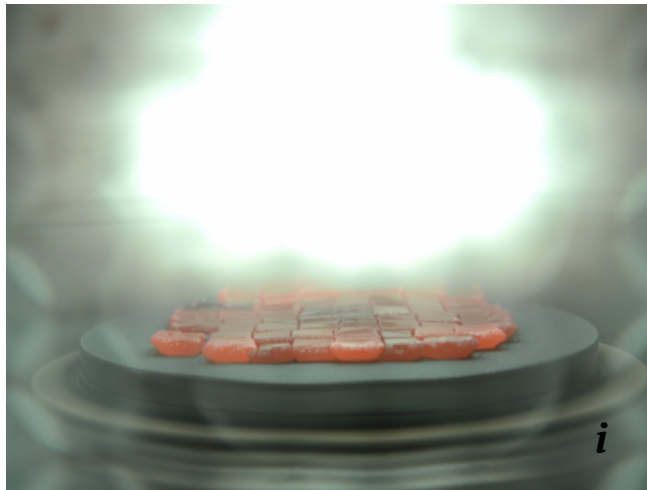
Register for a free copy
2017 now (/promotio
free-copy-home-esse

Each seed is made of a repeating lattice of carbon atoms – just like all diamonds.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/43b412fa-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

The seeds are placed inside a microwave plasma oven. The oven zaps natural gas into a plasma of carbon, which sticks to each seed and slowly builds up a diamond, atom by atom.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/5597b116-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

A company called Pure Grown Diamonds told Business Insider that it can take anywhere from 10 to 12 weeks to bake up a batch of substantially-sized diamonds in its Singapore lab.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/679c9782-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

Source: Pure Grown Diamonds

This is why jewellery-grade synthetic diamonds aren't cheap – and why actor Leonardo DiCaprio and 10 billionaires have invested in Diamond Foundry, which claims it can cut the time to a few weeks.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/7ef04226-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

Source: Business Insider

Diamond Foundry's process also uses CVD, though at less pressure and at a higher temperature in a reactor that can reach 8,000 degrees Fahrenheit.

Photo: Diamond Foundry



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/969cb684-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

Source: Business Insider

After the synthetic diamonds are grown to spec, they're cut into rough shapes with a high-power laser.

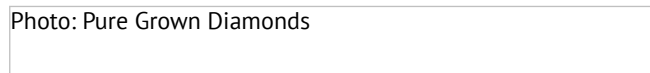
Photo: Pure Grown Diamonds



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/a909b3ee-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

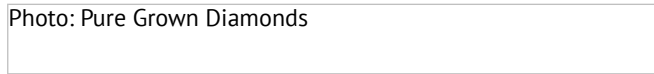
Most of the time they come out square to maximise the amount of synthetic diamond.

Photo: Pure Grown Diamonds



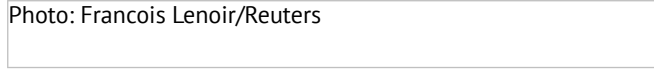
(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/bac2bac2-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

Next, just like natural diamonds, skilled workers polish the synthetic gems for faceting, Pure Grown Diamonds told us.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/cc8faaee-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

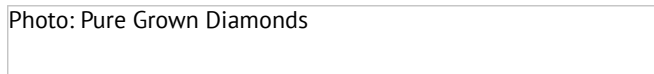
Any of the company's gems above 1/4 of a carat (a measure of diamond weight) are laser-inscribed with a registry number and graded by their colour, cut, clarity, and carat.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/e21645bc-94f6-11e6-89e7-0e47003bc2df_image_hires.png)

Source: Pure Grown Diamonds

The diamonds are then sold to retail outlets as synthetic, sustainable, and conflict-free diamonds.

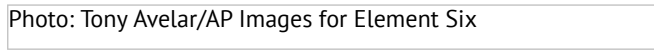


Outside the jewellery store, you can find cheaper synthetic diamonds everywhere. Like these diamond-encrusted drill bits for powering through glass.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/0cd7ad04-94f7-11e6-89e7-0e47003bc2df_image_hires.png)

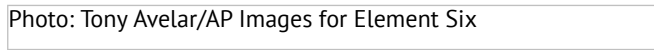
This diamond – a polycrystalline variety that's a single wafer and made by a company called Element Six– isn't for engagement rings. But the "super material" may be useful in radar systems, communications devices, and perhaps radio telescopes.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/1fc7c9f8-94f7-11e6-89e7-0e47003bc2df_image_hires.png)

Source: Element Six, Semiconductor Today, Associated Press

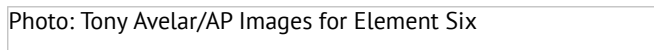
Other varieties of diamond, like this flat sheet, can become scratch-free optics that go into lenses, lasers, and infrared cameras.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/32d55b50-94f7-11e6-89e7-0e47003bc2df_image_hires.png)

Source: Element Six

Synthetic diamonds are even making their way into high-end speaker systems as the perfect tweeter material.



(http://www.scmp.com/sites/default/files/images/methode/2016/10/18/448eaa54-94f7-11e6-89e7-0e47003bc2df_image_hires.png)

Related Articles

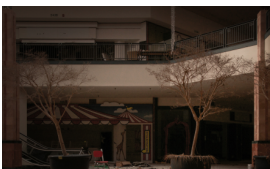


(/tech/science-research/article/2063556/how-telling-people-about-side-effects-drug-can-make-them-sick)

SCIENCE & RESEARCH
(TECHNOLOGY/SCIENCE-RESEARCH)

How the placebo or nocebo effect work (/tech/science-research/article/2063556/how-telling-people-about-side-effects-drug-can-make-them-sick)

19 Jan 2017



(/news/world/united-states-canada/article/2063526/shopping-

mall-sells-just-us100)

UNITED STATES & CANADA
(/NEWS/WORLD/UNITED-STATES-CANADA)

Shopping mall sells for just US\$100 (/news/world/united-states-canada/article/2063526/shopping-mall-sells-just-us100)

19 Jan 2017

Photo: Wikimedia Commons

(/news/asia/east-asia/article/2063179/elderly-account-20-cent-all-japans-crime-and-its-turning-prisons)

EAST ASIA (/ASIA/EAST-ASIA)

Elderly account for 20 per cent of all Japan's crime
(/news/asia/east-asia/article/2063179/elderly-account-20-cent-all-japans-crime-and-its-turning-prisons)

18 Jan 2017

Source: Element Six

See Also:

Apple's car project seems wracked with internal strife

(http://www.businessinsider.com/apples-driverless-car-project-in-turmoil-2016-10?utm_source=scmp&utm_medium=referral)

Clinton and Trump's very different reactions to North Carolina firebombing

(http://www.businessinsider.com/clinton-and-trump-statements-on-the-nc-gop-firebomb-2016-10?utm_source=scmp&utm_medium=referral)

Retailers realising that starting Black Friday on Thanksgiving is a terrible idea

(http://www.businessinsider.com/thanksgiving-day-shopping-is-no-longer-a-thing-2016-10?utm_source=scmp&utm_medium=referral)

Click here to visit Business Insider (http://www.businessinsider.com?utm_source=scmp&utm_medium=referral) →