

# Diamonds key to a sparkling listening experience

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Music lovers could be in for the ultimate listening experience, thanks to a new range of speakers containing parts made of diamond, writes Marina Murphy in the Chemistry & Industry magazine. The unique properties of diamond make the speakers less susceptible to distortion and thus provide a clearer sound, say their manufacturers Bowers & Wilkins (B&W), UK.

The 800 Series speakers contain diamond ‘tweeter domes’ – the parts responsible for producing high-frequency sound. The domes are tiny components that move backwards and forwards in the speaker. The compressed air that results creates a pressure wave, which in turn produces sound.

Because diamond is rigid and very strong, the sound waves pass through the domes very quickly. But some tweeter domes made of traditional materials such as aluminium are susceptible to distortion at high frequencies.

For example, aluminium tweeter domes break up at a frequency of around 30 kHz, whereas the diamond tweeter domes are stable up to 70 kHz.

“The unique properties of diamond mean that we can create tweeter domes that are stiff, light and remain rigid throughout the audible frequency and beyond,” said Dr Gary Geaves, Head of Research at B&W.

Although other companies have produced diamond speaker parts, B&W's are unique in that their diamond domes are skirted. This 'skirt' – a cylindrical section at the end of the dome – adds further rigidity, making the speakers even less susceptible to distortion.

The diamond is grown synthetically directly from methane and hydrogen gas using a carefully-regulated process called chemical vapour deposition (CVD), which involves heating the gases to very high temperatures (2000-3000 C) in a chamber, so that their carbon–hydrogen bonds break down to produce a carbon plasma that can grow a dome-shaped substrate in the chamber.

To produce a diamond using CVD takes a few days. It is a low cost process that will allow B&W to produce their speakers in large volumes. The CVD process was developed by the company Element Six, UK.

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