

## Electronic Supplementary Information: Studies of Black Silicon and Black Diamond as materials for antibacterial surfaces

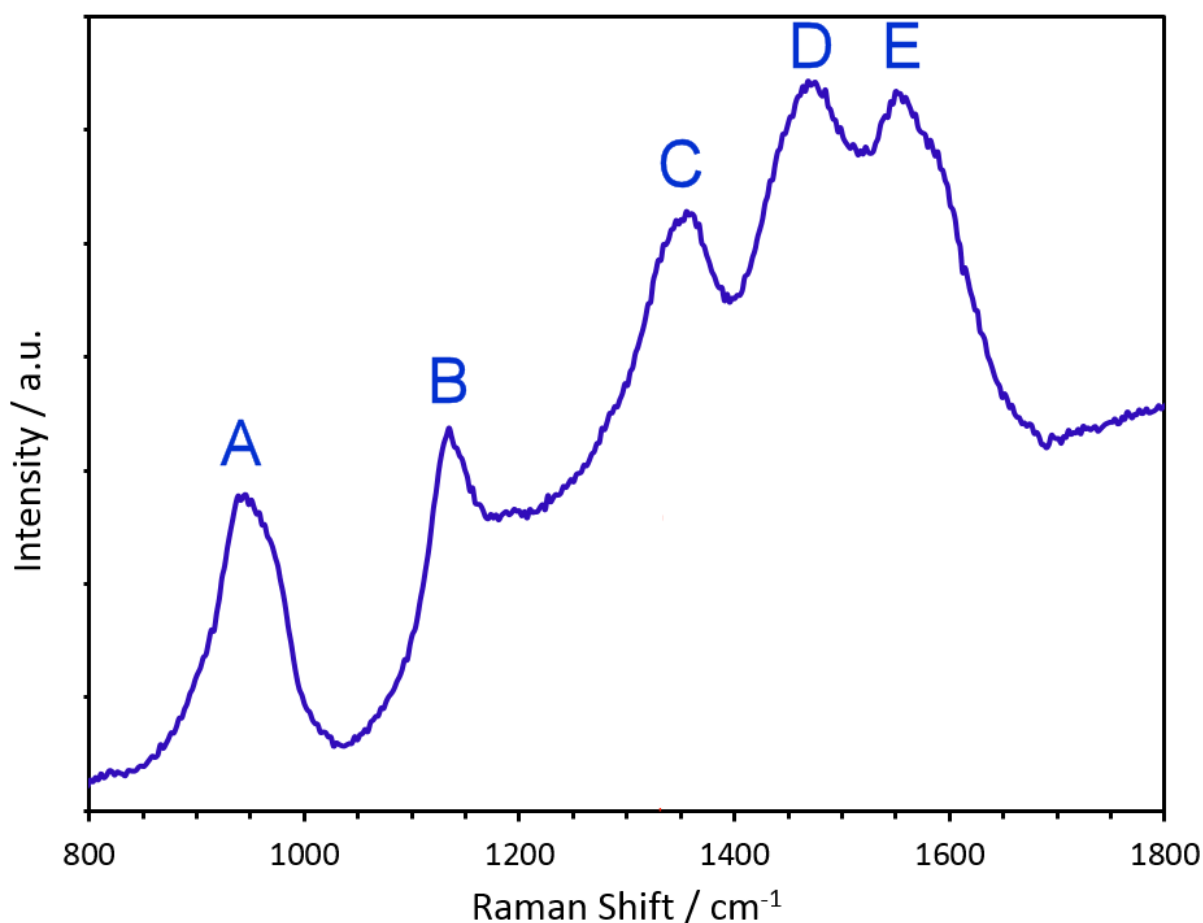
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**Supplementary Fig.1.** Laser Raman spectrum (514 nm excitation wavelength) of the bD long needles. The spectrum is typical of that from a thin (<0.5  $\mu\text{m}$ ) microcrystalline CVD diamond film on a Si substrate [Ref: J. Filik, Raman Spectroscopy: a simple, non-destructive way to characterise diamond and diamond-like materials, *Spectroscopy Europe* **2005** 17 10-17]. The characteristic regions of the spectrum are: (A) the second-order peak of Si; peaks at (B)

~1150 cm<sup>-1</sup> and (D) 1475 cm<sup>-1</sup> associated with the sp<sup>2</sup> carbon found at the grain boundaries of nanoscale diamond crystallites (often referred to as *trans*-polyacetylene); (C) the diamond peak, which is normally centred at 1332 cm<sup>-1</sup> but here is shifted and broadened due to the small film thickness; and (E) the G-band due to sp<sup>2</sup> carbon found at grain boundaries.

### Contact Angle Measurements and Surface Energy Characterisation

To provide an additional surface characterisation technique, contact angle measurements were performed. The wetting of a surface and its associated contact angle is dependent on the chemical make-up and the micro/nanotexture for a given chemical composition. Increasing the roughness of an interface may render it more hydrophilic or hydrophobic depending upon the initial surface properties of the material. In the case of the bSi and bD nanoneedles, the water droplet immediately spreads across the interface, failing to form a droplet with which to measure the contact angle, thus demonstrating a super-hydrophilic surface. For this reason, the contact angle was measured on an analogous uncoated and diamond-coated flat surface. The surface energy was also derived from use of the Zisman plot.

Surface Type	Contact Angle / °	Surface Energy / (mN m <sup>-1</sup> )
Bare silicon	48.5 ± 3	23.4 ± 2
Diamond-coated silicon	85.8 ± 7	31.9 ± 3

**Supplementary Table 1.** Contact angle data and surface energy calculation for bare silicon and diamond coated silicon.