

Supplementary Material to the article

“Synthesis of epitaxial structures with two-dimensional Si layers embedded in CaF_2 dielectric matrix”

The Raman spectra were recorded at room temperature in the backscattering mode of measurements. For excitation, we used the Ar^+ laser line at the wavelength 514.5 nm. The measurements were carried out with a T64000 (Horiba Jobin Yvon) spectrometer. The spectral resolution was no worse than 2 cm^{-1} . For detection, we used a silicon matrix of photodetectors cooled with liquid nitrogen. The laser beam power at the sample surface was 2–3 mW.

The structural properties of the samples were analyzed by means of a spherical aberration corrected transmission electron microscope Titan 80–300 operated at 300 keV.

The sample morphology was studied with atomic force microscope (Solver Pro NT-MDT) in a tapping mode.

We studied the electron paramagnetic resonance using a standard Bruker X-band spectrometer operating at a frequency close to 9.7 GHz at sample temperatures ranging from 4.5 to 20 K. The samples represent rectangular plates with size $4 \times 12\text{ mm}^2$. Samples are glued on a quartz holder, allowing a rotation in the magnetic field, and then the entire cavity and samples were maintained at low temperature with a helium flow cryostat (Oxford CF935).

The photoluminescence spectra were recorded using an MDR-23U diffraction monochromator at 78 K and direct immersion of the samples in an optical cryostat with liquid nitrogen. A diode laser module operating at a wavelength of 405 nm with a power of up to 120 mW was used to excite luminescence. A photoelectronic multiplier of the R9011 type for the 0.2–0.85 μm visible region of the light spectrum was used as a photodetector.

