

Data and Code Description

(1) Folder “Fig_1-experiment” contains raw near-field data in “.dump” format (recorded by Neaspec s-SNOM software (Linux version)) for the Ge-SiC structure discussed in Fig. 1 measured at different time points after the sample fabrication (indicated in names of corresponding subfolders). In subfolders we also included partly processed data files used for extraction of the polariton wavelength (files in “.gwy” and “.txt” formats).

Processing guidelines:

- Data were processed by “Gwyddion (v. 2.31.win64)” software.
- [x,y] dimensions were multiplied by a factor of 0.975 to take into account s-SNOM scanner calibration.
- Built-in cross-sections of the “.gwy” data, used for analysis, could be seen by clicking on “Extract profiles” Gwyddion tool. The number of adjacent lines (“Thickness” textbox in “Profiles” window) is given in names of corresponding “.txt” files (each “.txt” file is the resulting exported data along these cross-section using corresponding “Thickness” settings).

(2) Folder “Fig_1c-calculations” contains calculations data and code corresponding to Fig. 1c.

Default programming environment: Python 3.7.1

Installed packages: Scipy(v1.4.1); Matplotlib(3.1.3)

Fig. 1c is generated by running the script “924p5cm_geo2_thickness-20190408.py”. The data for the lines in the figure will be saved in the folder “data924”: “Imag_reflection_924.txt” – the data for the image; “max_imag_R_924” and “analytical_model_924” – data for black and pink curves respectively; the other two files define the axis of the plot.

(3) Folder “Fig_2” contains raw near-field data in “.dump” format (recorded by Neaspec s-SNOM software (Linux version)) for Ge-SiC resonators in Fig. 2. In subfolders we also included partly processed data files used for the cross-section and final images extraction (files in “.gwy” and “.txt” formats).

Processing guidelines:

- Data were processed by “Gwyddion (v. 2.31.win64)” software.
- [x,y] dimensions were multiplied by a factor of 0.975 to take into account s-SNOM scanner calibration.
- Data were rotated/cropped to form the final figure images.
- Built-in cross-sections of the “Fig_2d_with-cross-section_.gwy”, “Fig_2e_with-black-cross-section_.gwy” and “Fig_2e_with-pink-cross-section_.gwy” data (corresponding to Fig. 2f,g) could be seen by clicking on “Extract profiles” Gwyddion tool. The number of adjacent lines (“Thickness” textbox in “Profiles” window) was set as “1” (single-line).

(4) Folder “Fig_3” contains raw and processed data corresponding to Fig. 3. Fig. 3 (d-f) is calculated based on the “Theoretical calculations” in the “Methods” section of the article and generated by the code “SiC_Ge_resonator.ipynb” (Default programming environment: Python 3.7.1. Installed packages: Scipy(v1.4.1); Matplotlib(3.1.3)). The data are saved automatically in the same directory.

Data for Fig. 3(g-i) are automatically saved simultaneously in the same directory. Processing guidelines for raw near-field data are similar to section (3) above.

(5) Folder “Fig_4” contains raw and partly processed data corresponding to Fig. 4. Processing guidelines for raw near-field data are similar to sections (3) above. “Thickness” textbox in “Profiles” window in Gwyddion to be set as 1 or 7 (for blue curve on Fig_4c). Cross-sections were normalised as described in the article.

(6) Folder “Suppl_Fig_1” contains raw and partly processed topography data corresponding to Supplementary Fig. 1. Processing guidelines for raw data in Gwyddion are similar to sections (1), (3) above. Additionally, topography data were plane-corrected using 3-points Gwyddion levelling tool. The minimum data value was shifted to zero. X-axis of 1- and 16-days cross-sections were aligned in “Origin” for the final plot.

(7) Folder “Suppl_Fig_3” contains raw and processed XPS data corresponding to Supplementary Fig. 3. Processing guidelines follow “Methods” (“X-ray photoelectron spectroscopy”) section of the article.

(8) Folder “Suppl_Fig_4/calculations” contains calculations data and code corresponding to Supplementary Fig. 4.

Default programming environment: Python 3.7.1

Installed packages: Scipy(v1.4.1); Matplotlib(3.1.3)

Supplementary Fig. 4 is generated by running the script “930cm_geo2_thickness_dispersion.py”. The data for the lines in the figure will be saved in the folder “data930”: “Imag_reflection_930.txt” – the data for the image; “max_imag_R_930” and “analytical_model_930” – data for black and pink curves respectively; the other two files define the axis of the plot.

Folder “Suppl_Fig_4/Experiment” contains experimental data. Processing guidelines are similar to section (1) above.

(9) Folder “Suppl_Fig_5” contains calculation data and codes corresponding to Supplementary Fig. 5. For Supp. Fig. 5 (a), open the Lumerical files “Supp_5a.fsp” and run the script “Supp_5a.lsf”, the simulation will start to run (on platform of commercial software “Lumerical FDTD”). After the simulation finish, the figure will be generated and data saved in the current directory. Other figures and data can be generated similarly.

(10) General guidelines: article’s data were visualized using Gwyddion, Origin and Python software environments. The resulting images were assembled into the final article-version figures using “Inkscape” vector graphic editor.