READ ME File For 'Dataset for: Germanium-on-Carborundum Surface Phonon-Polariton Infrared Metamaterial'

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TITLE:Germanium-on-Carborundum Surface Phonon-Polariton Infrared Metamaterial

JOURNAL: Advanced Optical Materials

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This dataset contains:

1.Simulation documents for SiC-SiC metamaterials of different heights
2.Simulation documents for SiC-Ge metamaterials of different heights
3.Simulation documents for SiC-Ge metamaterials of different diameters
4.Reflection spectra of SiC-Ge metamaterials
5.Reflection spectra of SiC-Ge metamaterials for sensing of PMMA film.

The figures are as follows:
Fig. 1(c, d)   Simulated electric field enhancement of Re(Ez) along x-z and (c) x-y directions (d)
Fig. 2   Simulated reflection spectra of phonon-polaritonic metamaterials
Fig. 3   Dependence of the hybrid phonon-dielectric metamaterials resonance on the germanium disk diameter
Fig. 4   Refractive index sensing using hybrid phononic-dielectric metamaterials
Fig. S1   Re-plot of Figure 3(b) with additional fitting data (circle-dotted curves) used for extraction of the peak positions from experiment spectra.

Data and Code Description
(1) Folder Fig.1 contains raw simulation file for Fig. 1(c) and (d). The two figures can be reproduced by running the simulation file "SiC_Ge_Fig1.fsp" using Lumerical FDTD. The data for Fig.1(c) and (d) can be obtained from 'xz' monitor and 'xy' monitor respectively. The data are exported and replotted in origin files "figures.opj".

(2) Folder Fig.2 contains raw simulation files for Fig. 2(a) and (b). The two figures can be reproduced by running "Mat" sweep in the simulation file "SiCSiC_SiCGe_Fig2.fsp" using Lumerical FDTD. The "Mat" sweep will simulate both materials for all the heights. The data

are exported to Origin Lab for normalization and replotted in origin files "figures.opj".

(3) Folder Fig.3a contains raw simulation files for Fig. 3(a). The figure can be reproduced by running the "D" sweep in the simulation "SiCGe_D.fsp" file using Lumerical FDTD. The "D" sweep simulates the spectrum of all the reflection spectrum, including the background. The data are exported to Origin Lab for normalization and replotted in origin files "figures.opj"

(4) Folder Fig.3b contains raw data for Fig. 3(b). The data are imported to Origin Lab for normalization and replotted in origin files "figures.opj".

(5) Folder Fig.3c contains the code for generating for Fig. 3(c).
Default programming environment: Python 3.7.1
Installed Packages: Scipy (v1.4.1); Matplotlib(3.1.3)
The figure can be generated by running the file Figure3c.ipnb. The figure will be generated and saved in the same directory.

(6) Folder Fig.4 contains raw data for Fig. 4. The data are imported to Origin Lab for normalization and replotted in origin files "figures.opj"

(7) Folder Fig. S1 contains the code and experimental data for generating for Fig. S1.
Default programming environment: Python 3.7.1
Installed Packages: Scipy (v1.4.1); Matplotlib (3.1.3)
The figure can be generated by running the file FigureS1.ipnb. The figure will be generated and saved in the same directory.

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Information about geographic location of data collection: Singapore

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Related projects: EP/M009122/1

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