**Supplementary informations**

**A DFT perspective analysis of optical properties of defected germanene mono-layer**

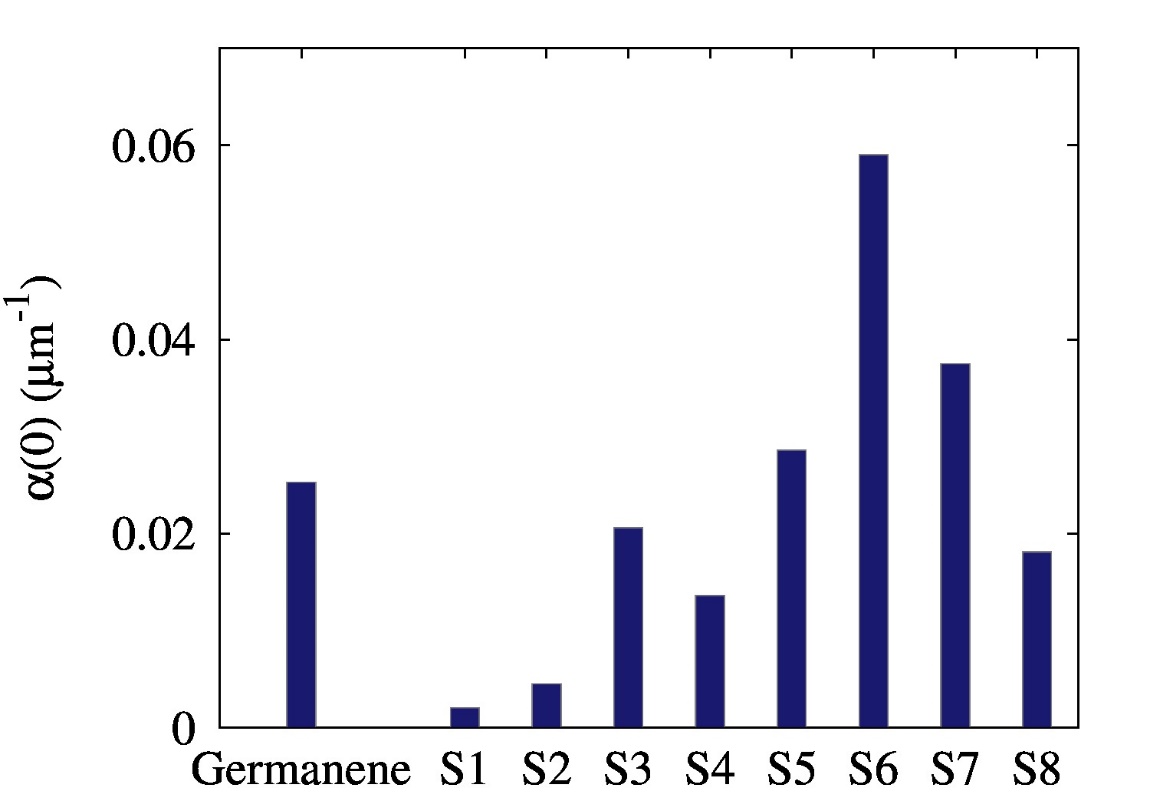
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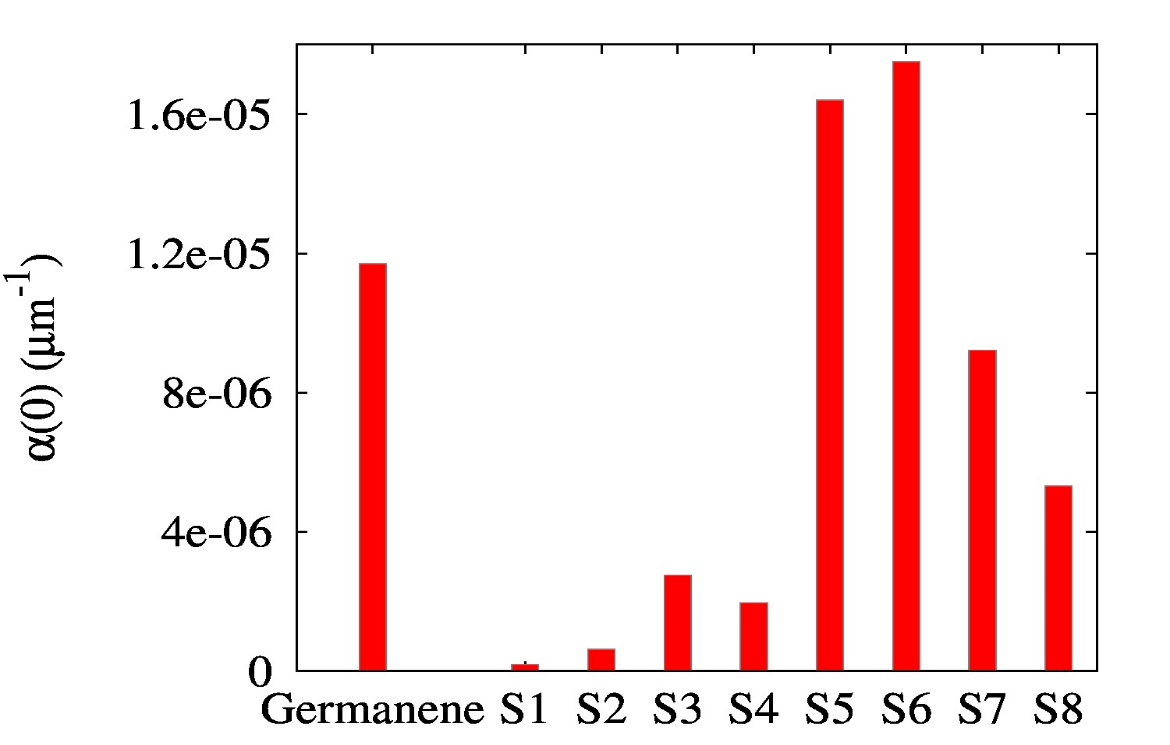
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**Table A : Values of infrared absorbance (α(0)) for As and Ga doped germanene systems including pristine one for both types of polarizations:**

|  |  |  |
| --- | --- | --- |
| **Configuration** | **α(0) for parallel polarization (μm-1)** | **α(0) for perpendicular polarization (μm-1)** |
| Germanene | 2.53×10-2 | 1.17×10-5 |
| S1 | 2.06×10-3 | 1.86×10-7 |
| S2 | 4.54×10-3 | 6.20×10-7 |
| S3 | 2.06×10-2 | 2.75×10-6 |
| S4 | 1.36×10-2 | 1.96×10-6 |
| S5 | 2.86×10-2 | 1.64×10-5 |
| S6 | 5.90×10-2 | 1.75×10-5 |
| S7 | 3.75×10-2 | 9.22×10-6 |
| S8 | 1.81×10-2 | 5.31×10-6 |



**Fig. A :** α(0) for pristine germanene and As and Ga doped configurations for parallel polarization.



**Fig. B :** α(0) for pristine germanene and As and Ga doped configurations for perpendicular polarization.