

Lasing Reporting Summary

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► Experimental design

Please check: are the following details reported in the manuscript?

1. Threshold

Plots of device output power versus pump power over a wide range of values indicating a clear threshold

☒ Yes
☐ No

Main Manuscript: Figure 5, Supplementary Information: Figure S30-S34

2. Linewidth narrowing

Plots of spectral power density for the emission at pump powers below, around, and above the lasing threshold, indicating a clear linewidth narrowing at threshold

☒ Yes
☐ No

Main Manuscript: Figure 5, Supplementary Information: Figure S30-S34

Resolution of the spectrometer used to make spectral measurements

☒ Yes
☐ No

Main Manuscript Methods section

3. Coherent emission

Measurements of the coherence and/or polarization of the emission

☒ Yes
☐ No

Supplementary Information: Figure S35

4. Beam spatial profile

Image and/or measurement of the spatial shape and profile of the emission, showing a well-defined beam above threshold

☒ Yes
☐ No

Main Manuscript: Figure 5, Supplementary Information: Figure S32

5. Operating conditions

Description of the laser and pumping conditions
Continuous-wave, pulsed, temperature of operation

☒ Yes
☐ No

Main Manuscript Methods section

Threshold values provided as density values (e.g. W cm⁻² or J cm⁻²) taking into account the area of the device

☒ Yes
☐ No

Main Manuscript: Figure 5, Supplementary Information: Figure S30-S34

6. Alternative explanations

Reasoning as to why alternative explanations have been ruled out as responsible for the emission characteristics
e.g. amplified spontaneous, directional scattering; modification of fluorescence spectrum by the cavity

☒ Yes
☐ No

Main Manuscript: Figure 5 caption, Supplementary Information: Figure S30-S34 caption.

7. Theoretical analysis

Theoretical analysis that ensures that the experimental values measured are realistic and reasonable
e.g. laser threshold, linewidth, cavity gain-loss, efficiency

☒ Yes
☐ No

Supplementary Information: Figure S32

8. Statistics

Number of devices fabricated and tested

☐ Yes
☒ No

This work focuses on the structure and performance relationship of OSiP materials. Demonstration of device is not the purpose of this work.

Statistical analysis of the device performance and lifetime (time to failure)

☐ Yes
☒ No

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