

# Sonication-free Scalable Liquid Exfoliation of Large-size Freestanding Tin Sulfide Nanosheets in Continuous Flow

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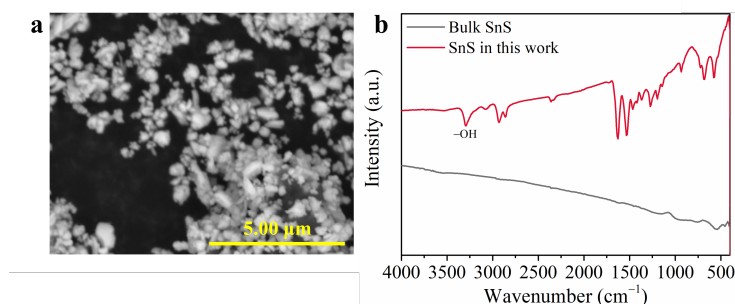
## Abstract

Earth-abundant and thermally stable, tin sulfide (SnS) as a distinctive in-plane anisotropic semiconductor has gained significant attention due to its promise in thermal electronics,<sup>1</sup> photodetectors,<sup>2</sup> field-effect transistors,<sup>3</sup> catalysis,<sup>4</sup> and energy storage.<sup>5</sup> Two-dimensional (2D) SnS can be synthesised via sonication-assisted liquid exfoliation,<sup>6,7</sup> but the challenges of large-size flakes and scalable, green, and cost-effective synthesis remains. Here we report an organic cation intercalation-assisted, fast, and scalable liquid exfoliation method for high-quality 2D SnS without sonication at a mild temperature and ambient pressure in continuous flow. The as synthesised 2D SnS exhibited an average size of 400 nm and has rich functional group on the surface. The properties of the 2D SnS have been characterised. This work opens a new frontier to advance mass production of high-quality and tuneable 2D SnS in a wide range of applications.

## References

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## Figures



**Figure 1:** a) Scanning Electron Microscopy image of 2D SnS. b) Fourier Transform Infrared Spectra of bulk and 2D SnS.