Electronic Supplementary Information

**Interfacial transmetallation synthesis of platinadithiolene nanosheet as a potential 2D topological insulator**

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1. Previous reaction schemes and PXRD for PtDT using BHT

Fig. S1. Reaction scheme for interfacial synthesis (a) similar to nickeladithiolene and (b) palladadithiolene CONASHs.

PXRD for Scheme b

Fig. S2. PXRD profiles of product obtained from route b in Fig. S1 (reaction with BHT).
2. IR spectrum of SnBHT compared with BHT

**Fig. S3** Comparisons of IR spectra (a) appearance of n-butyl peaks, (b) disappearance of S-H stretching and (c) presence of C=C and C-S in SnBHT and BHT, respectively.
3. XPS comparison between BHT and SnBHT

**Fig. S4.** S 2s peak of SnBHT (red) compared with BHT (navy blue).
4. Synthesis for SnPtDT

Fig. S5. Experimental setup for free standing SnPtDT.
5. Mechanism in removal of Bu$_2$SnO

Fig. S6. (a) Optical microscopic image of SnPtDT. (b) AFM image of the exfoliated SnPtDT; height profile marked in (d). (c) TEM image of SnPtDT, (inset) magnified image of the marked area, and both are in scale of 500 nm. (e) Synthetic and plausible mechanistic formation of Bu$_2$SnO. (f) Substrate reaction to remove agglomerate of Bu$_2$SnO from PtDT. (g) Optical image after removal of Bu$_2$SnO.
6. XPS of SnPtDT

Fig. S7. XPS spectra of (a) Pt 4f spectra presence of Pt$^{2+}$ in [PtS$_4$] motif of SnPtDT$_{54-17}$ (b) Sn 3d compared with SnPtDT (green curve) and SnBHT (red curve); (c) deconvoluted S 2s of SnPtDT, the red curve derived from bis(dithiolato) platinum(II) moities with 0 oxidation state; (d) comparison for the shift of S 2s spectra of SnPtDT (green curve) and SnBHT (red curve); the x-axis for all the graphs corresponds to binding energy in eV.
Fig. S8. XP spectra of SnPtDT showing the presence of Sn (inset)$^{34,37}$.
7. AFM image of SnPdDT

Fig. S9. AFM images of SnPtDt showing topography image and its cross-sectional analysis.
8. IR of PtDT

**Fig. S10.** IR spectra of PtDT, SnPtDT, and SnBHT.
9. XPS of PtDT after acetic acid treatment of SnPtDT

Fig. S11. (a) and (b) are deconvoluted S 2s and Pt 4f XP spectra of PtDT, respectively. 

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Fig. S12. XP spectra compared with PtDT and SnPtDT respectively, inset shows disappearance of Sn 3d peaks.
10. Illustrative experimental setup for gas-liquid reaction

**Fig. S13.** Synthesis of nano-PtDT.
11. AFM image for PtDT

Fig. S14. AFM images of nano-PtDt. (a) AFM topography image. (b) Zoomed image of (a) its cross-sectional analysis in c and d (with more standing time).
12. Comparison of PXRD pattern

![Image of PXRD pattern comparison]

**Fig. S15.** Comparison with PXRD pattern of eclipsed and staggered conformations.
13. XPS of PtDT-I

**Fig. S16.** (a) and (b) are deconvoluted Pt 4f and I 3d5/2 XP spectra of PtDT-I, respectively [55-58].
14. Synthetic scheme and characterization of PtDT-I

**Fig. S17.** (a) Reaction scheme showing activation of PtDT to PtDT-I; (b) and (c) AFM of PtDT (before) and PtDT-I (after I₂ treatment); (d) Raman spectra of PtDT compared with PtDT-I; (e) height profile of (b) and (c), scale of 20 μm, respectively.
15. Conductivity of PtDT-I

**Fig. S18.** Pelletized PtDT-I with attached Au electrodes, and I-V curve measured at room temperature.
16. Appendix

$^1$H NMR of SnBHT

$^{13}$C NMR of SnBHT
17. References


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