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Supplementary Materials: Freestanding Monolayer CrOCl Through Chemical Exfoliation†

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Table S 1 Concentration of chromium and lithium measured by ICP-OES two samples of lithiated CrOCl intermediates.

Lithiated Intermediate	Average Cr (ppm)	Cr Concentration (M)	Average Li (ppm)	Li Concentration (M)	Ratio (Li/Cr)
Sample 1	9.88	1.90E-4	1.21	1.74E-4	0.917
Sample 2	18.96	3.65E-4	2.54	3.66E-4	1.00

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† Electronic Supplementary Information (ESI) available. See DOI: 00.0000/00000000.

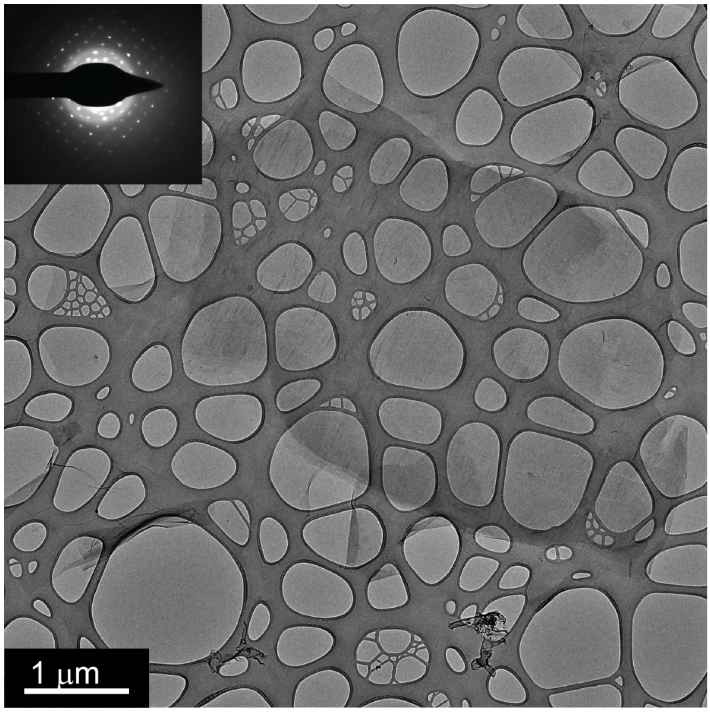

Fig. S 1 Transmission electron microscopy image of CrOCl nanosheet with diffraction.

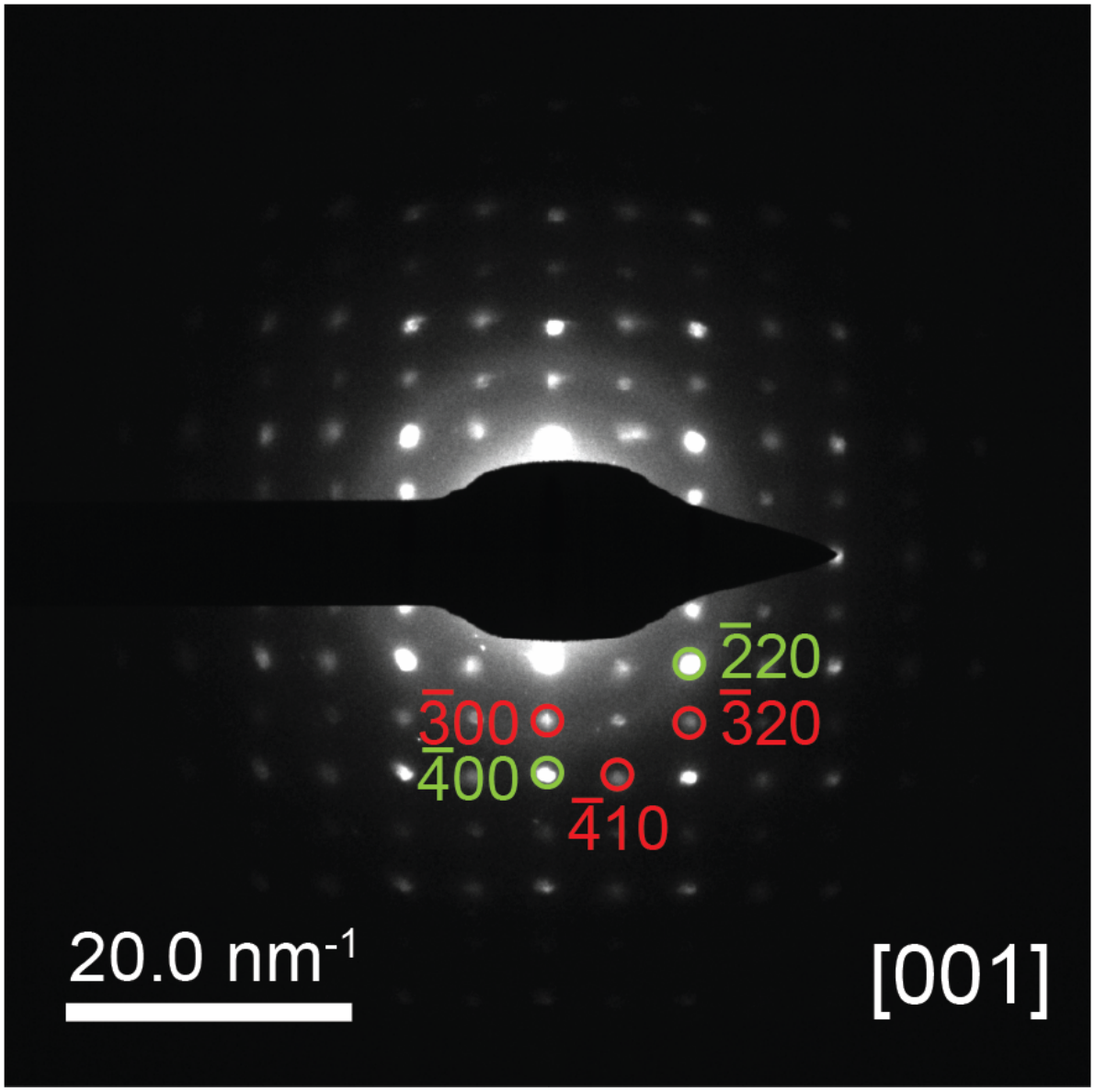

Fig. S 2 Diffraction pattern with labeled Bragg spots. Spots labeled in green are acceptable for an orthorhombic space group. Spots labeled with red are forbidden for an orthorhombic space group.

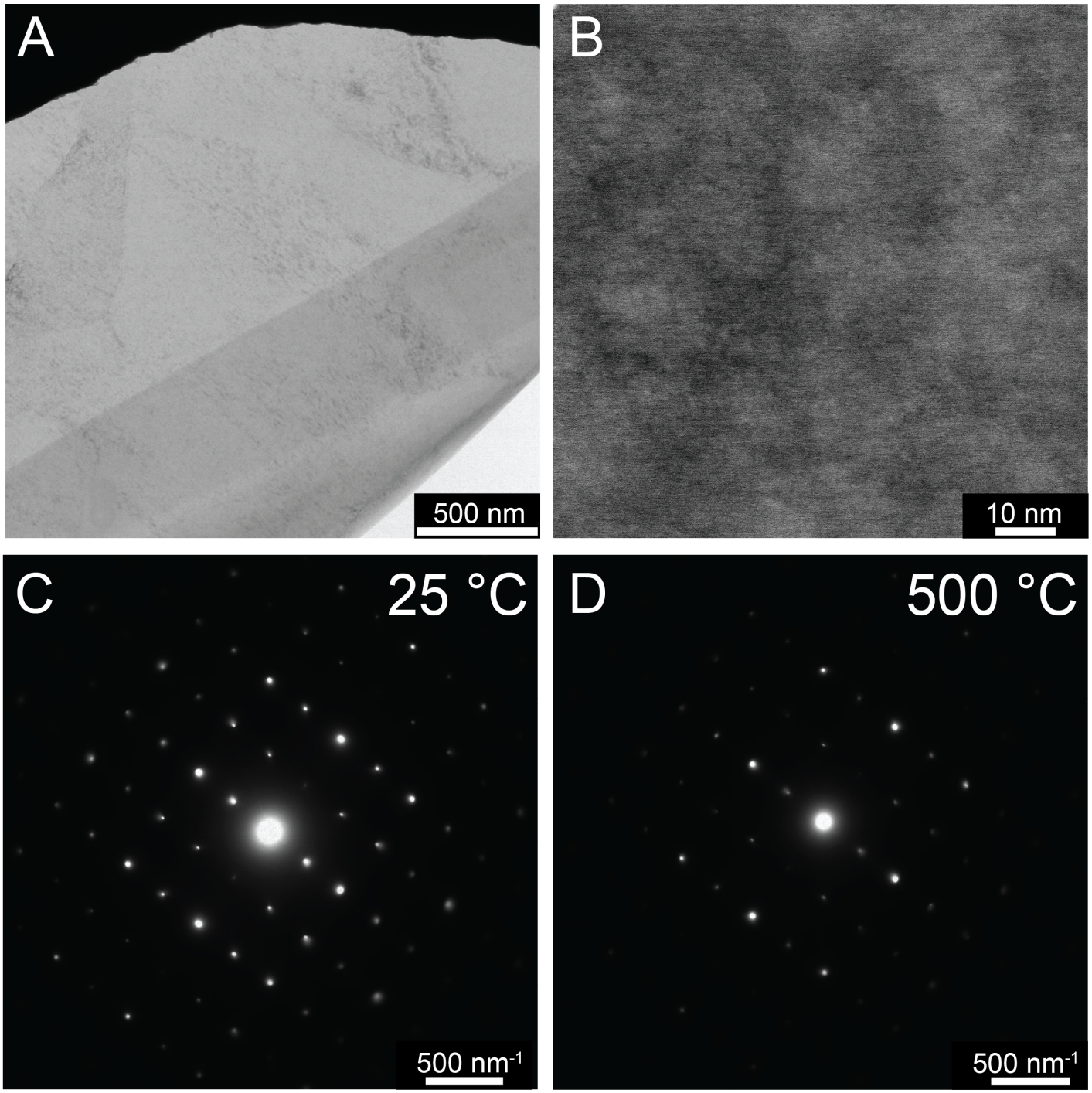

Fig. S 3 Images of CrOCl nanosheets taken using HRSTEM, including a (A) bright-field image and (B) a high-resolution image. The high resolution image shows a layer of amorphous material on top of the CrOCl nanosheets. Panels (C) and (D) depict diffraction patterns taken at 25 °C and 500 °C respectively showing no change in pattern with increasing temperature.

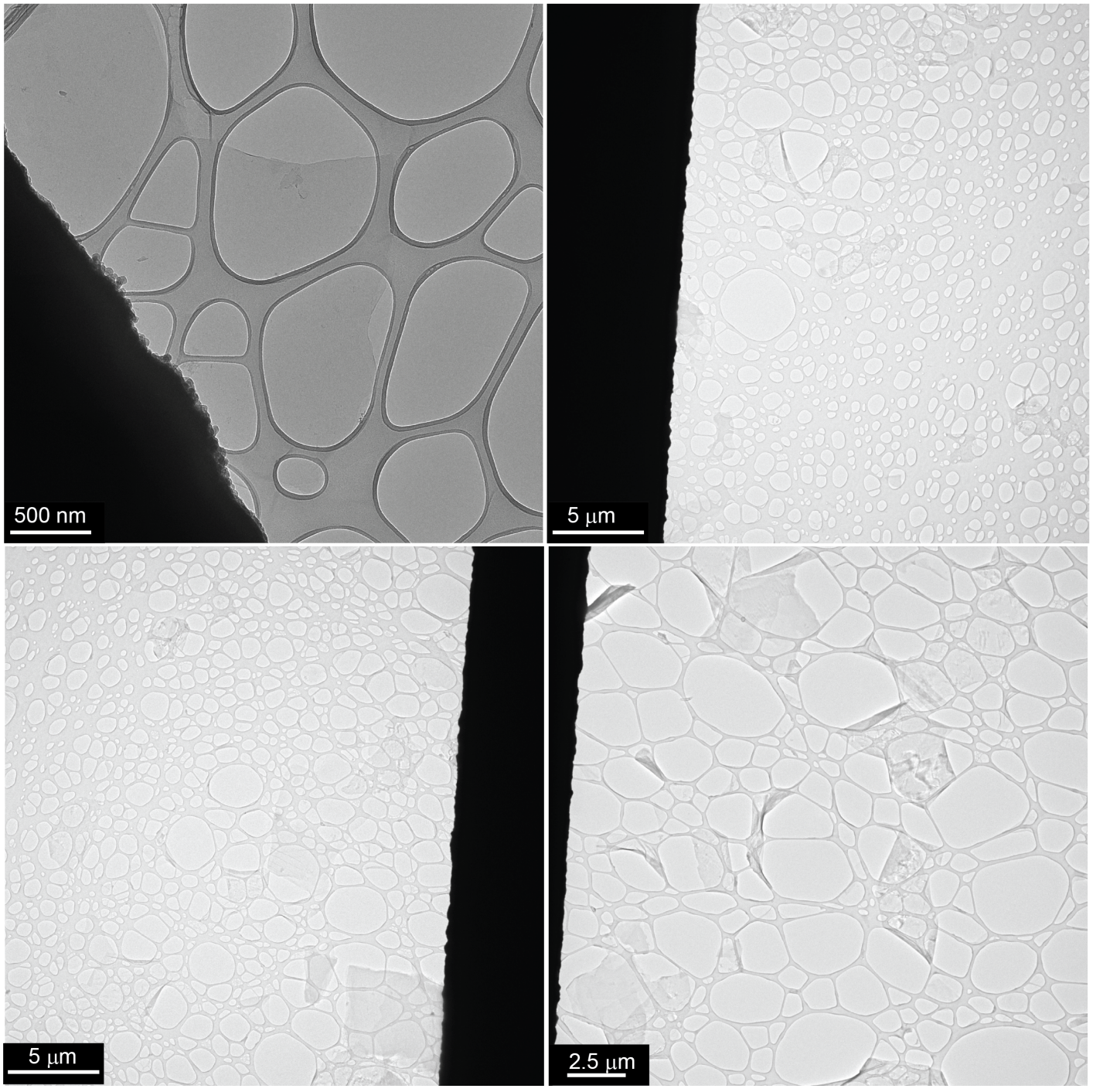

Fig. S 4 Additional transmission electron microscopy images of CrOCl nanosheets.

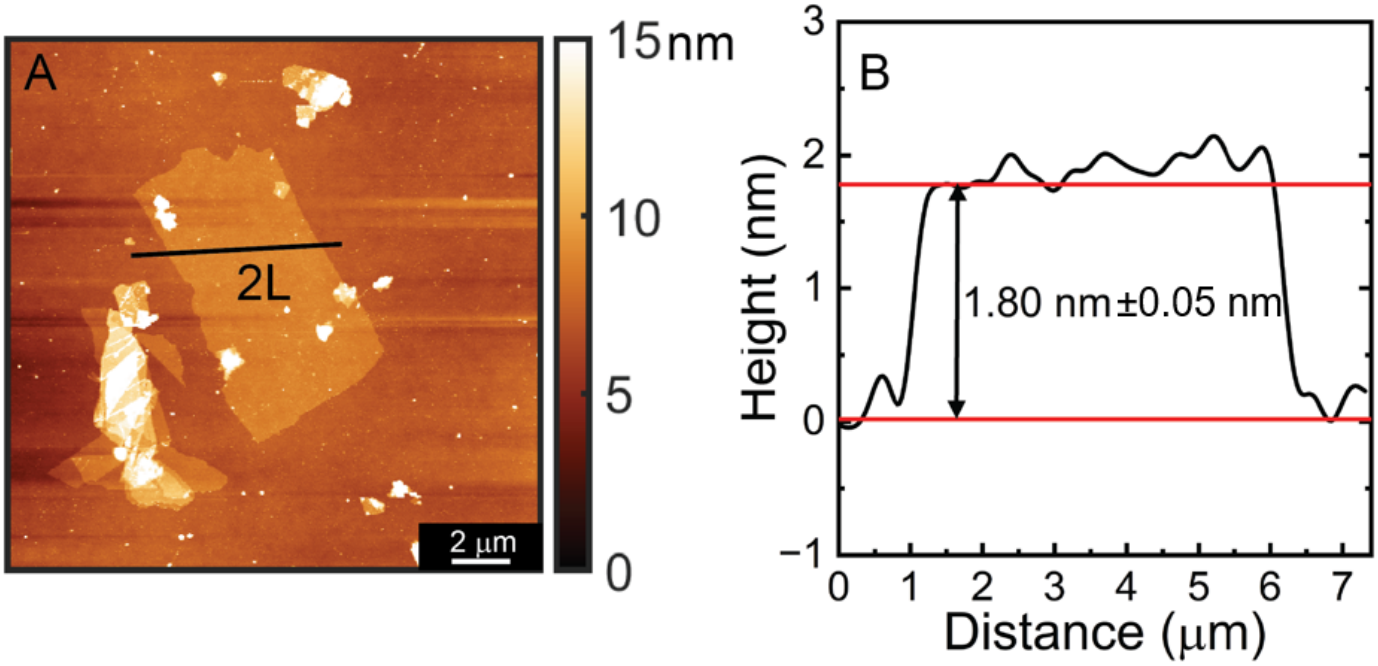

Fig. S 5 (A) Bilayer CrOCl nanosheet with corresponding (B) atomic force microscopy height measurement.

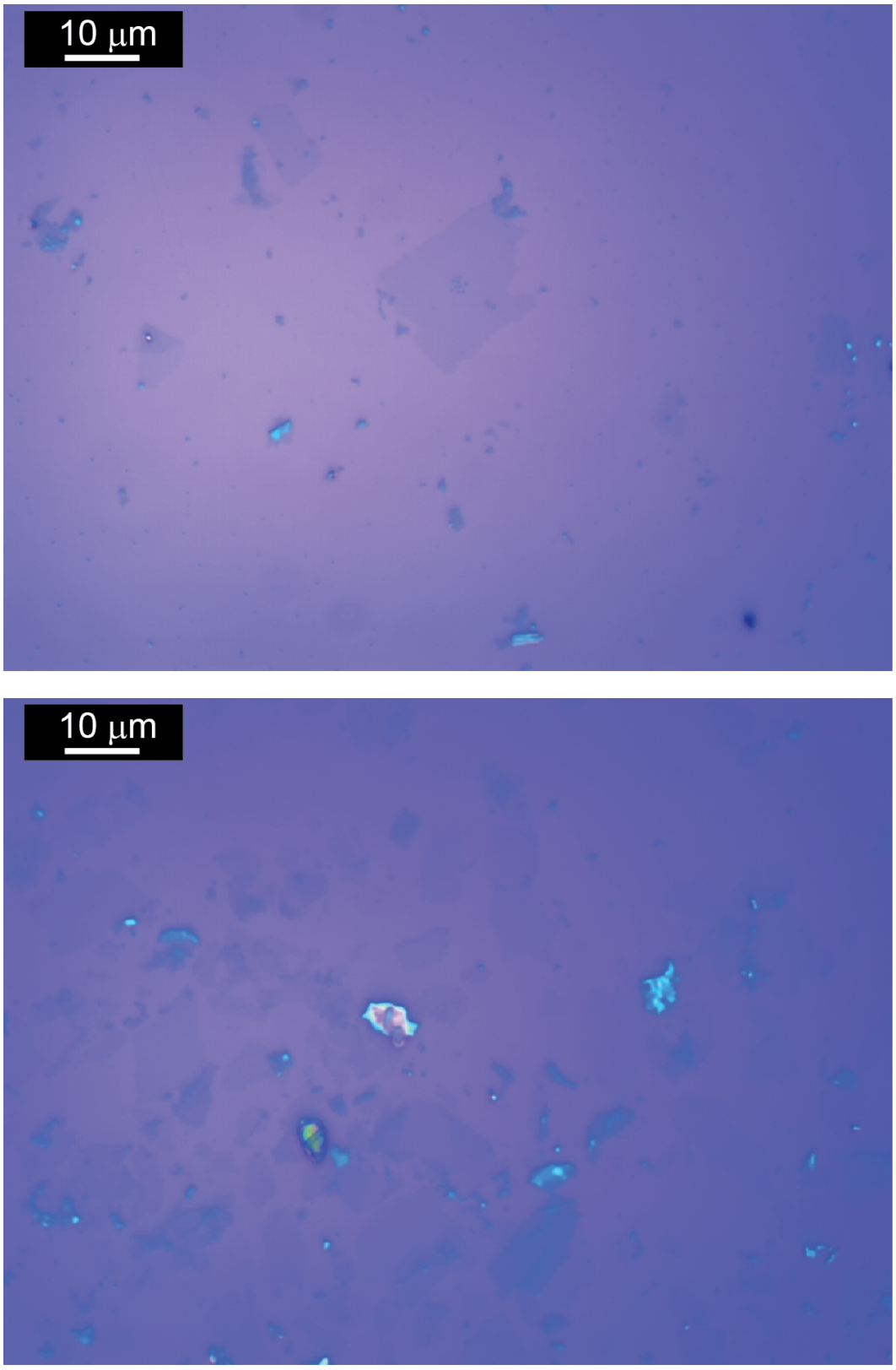

Fig. S 6 Optical microscope images of CrOCl nanosheets in two different spots on the silicon wafer. The top image contains the monolayer and bilayer measured by AFM shown in the main manuscript. The bottom image contains a large grouping of sheets. These images show the typical size distributions of nanosheets produced.

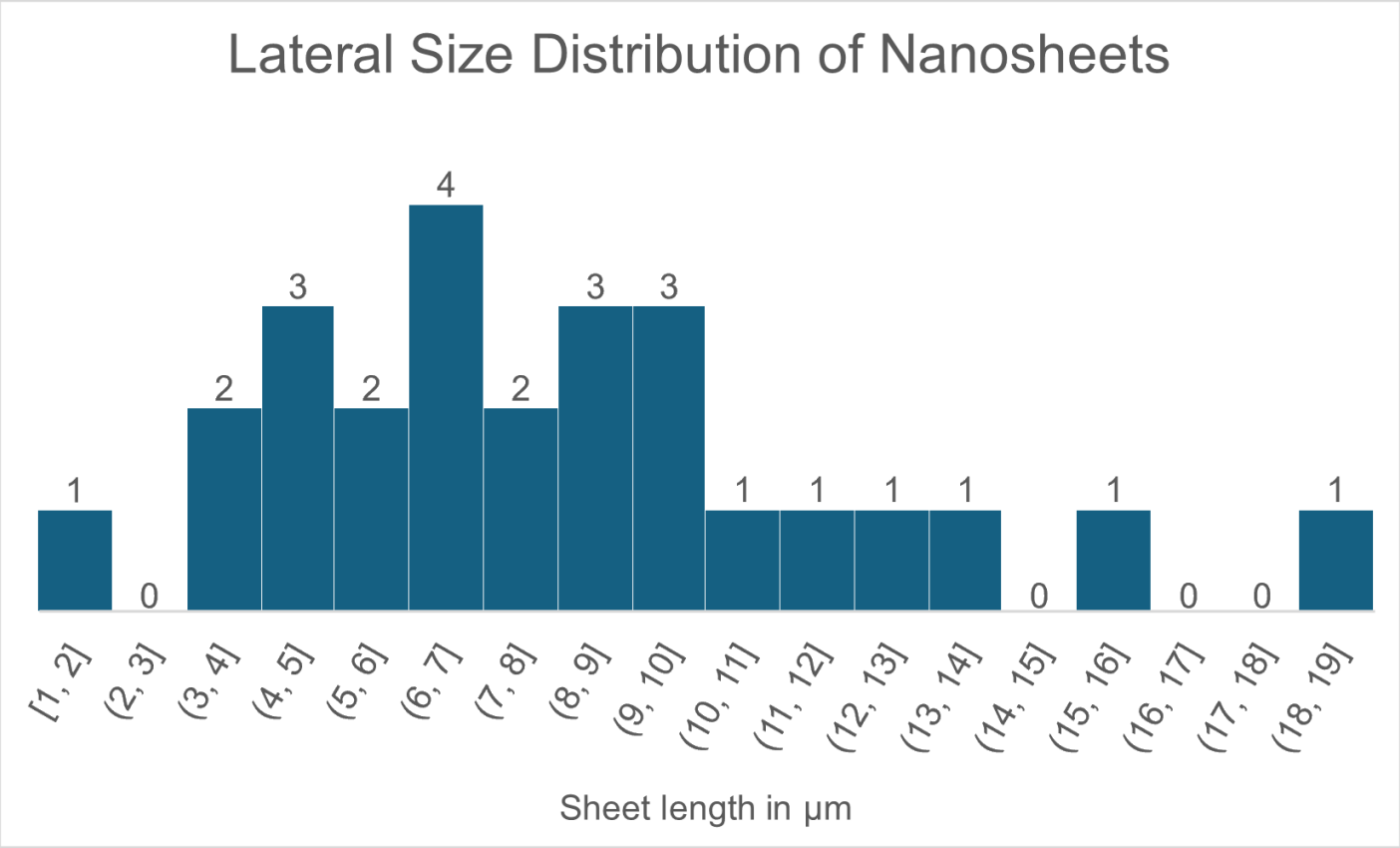

Fig. S 7 Histogram of the length distribution of 26 sheets measured from the optical image shown on the bottom of Figure S6. The average sheets size is 8 μm

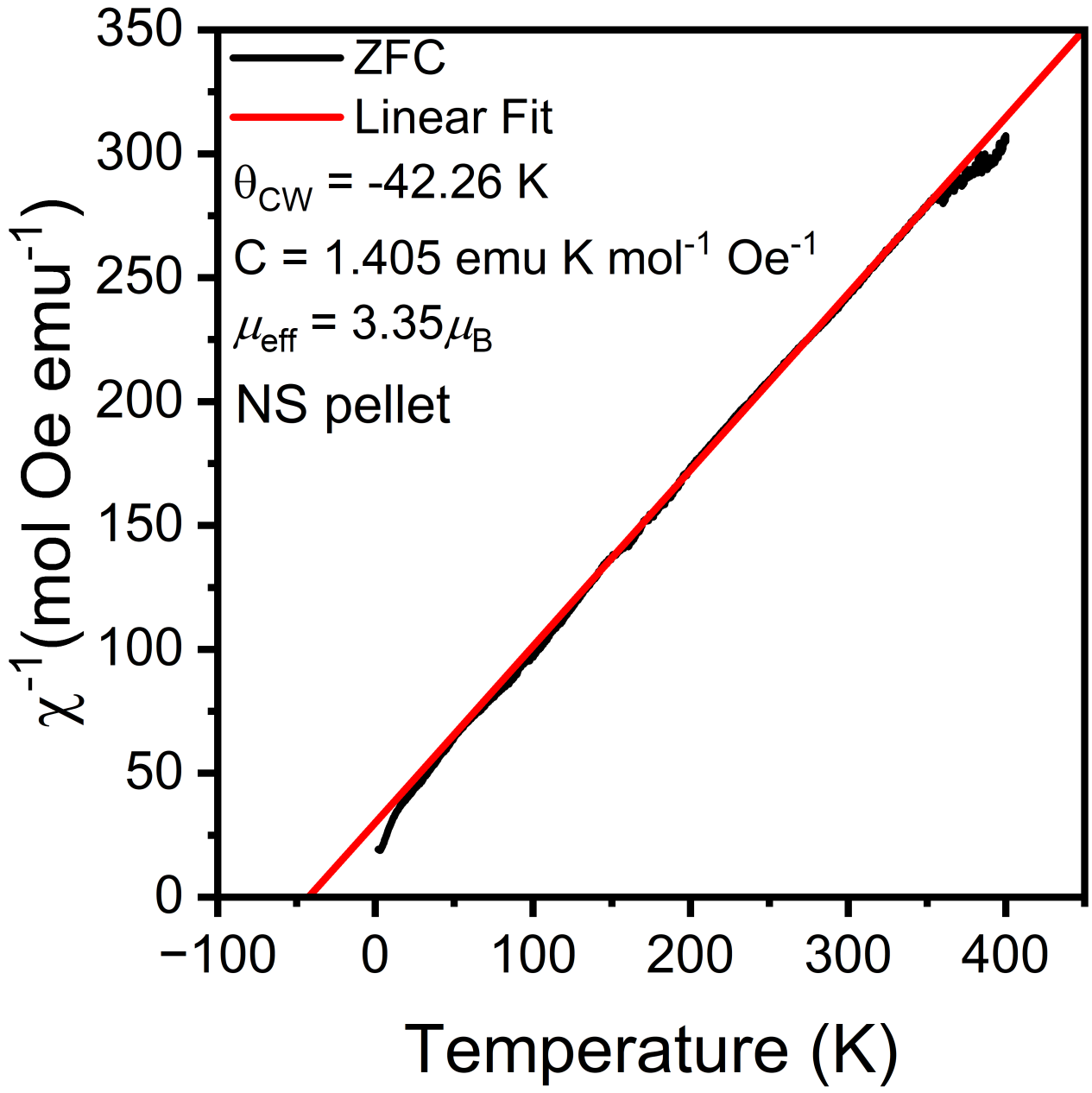

Fig. S 8 Curie-Weiss fit for the nanosheet CrOCl pellet. The negative Curie-Weiss temperature indicates an antiferromagnetic nature.

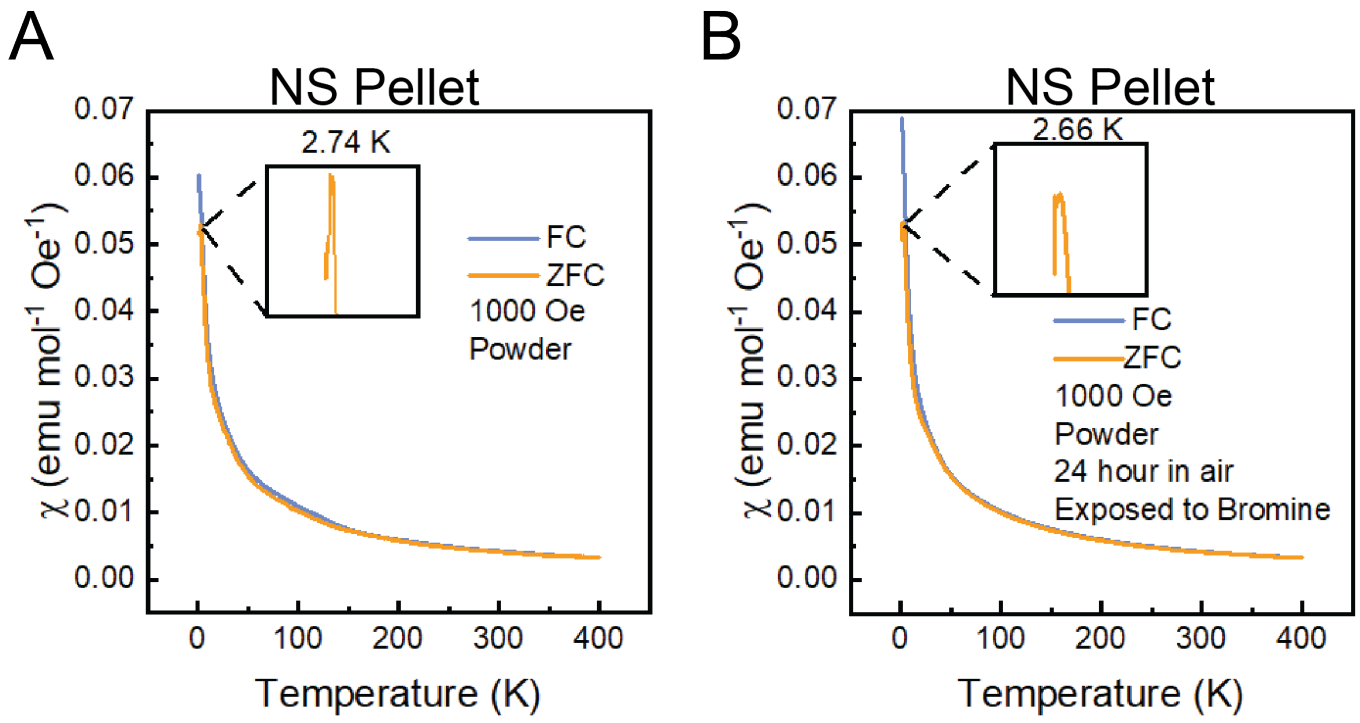

Fig. S 9 Magnetization versus temperature diagrams comparing a CrOCl restacked nanosheet pellet exposed to air for less than 24 hours (after restacking) and a nanosheet pellet that was exposed to air and bromine for over 24 hours. The transition temperature remains approximately the same, showing that this transition appears to be air stable.