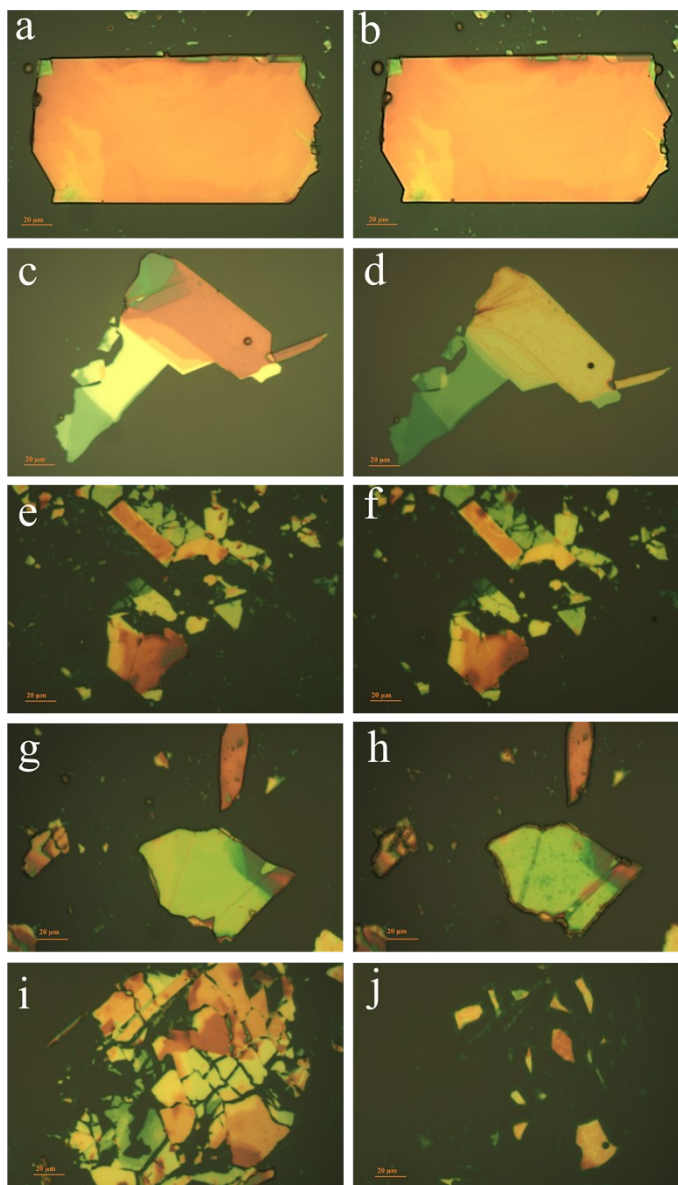
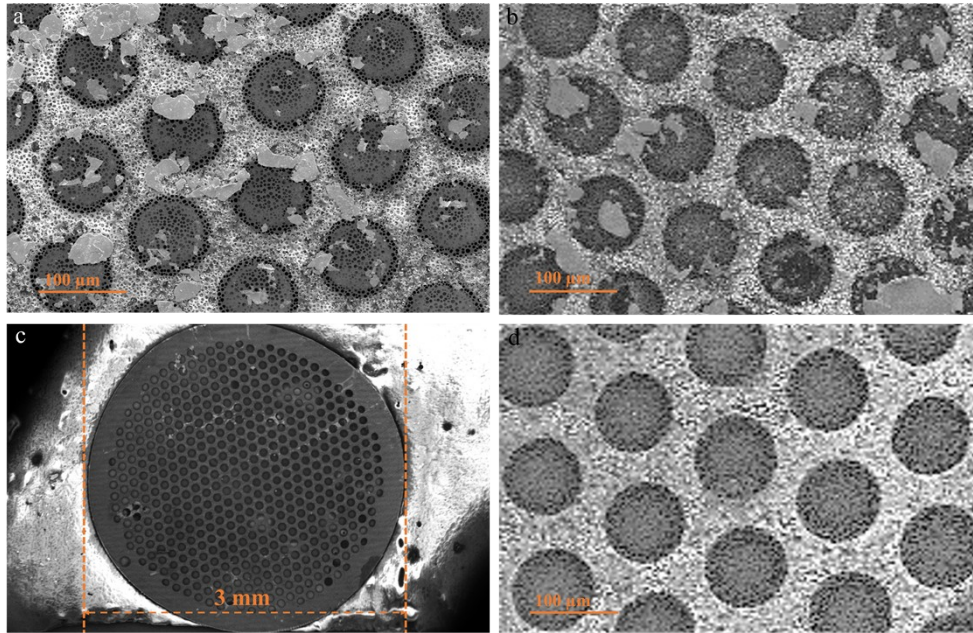


### Supplementary Information

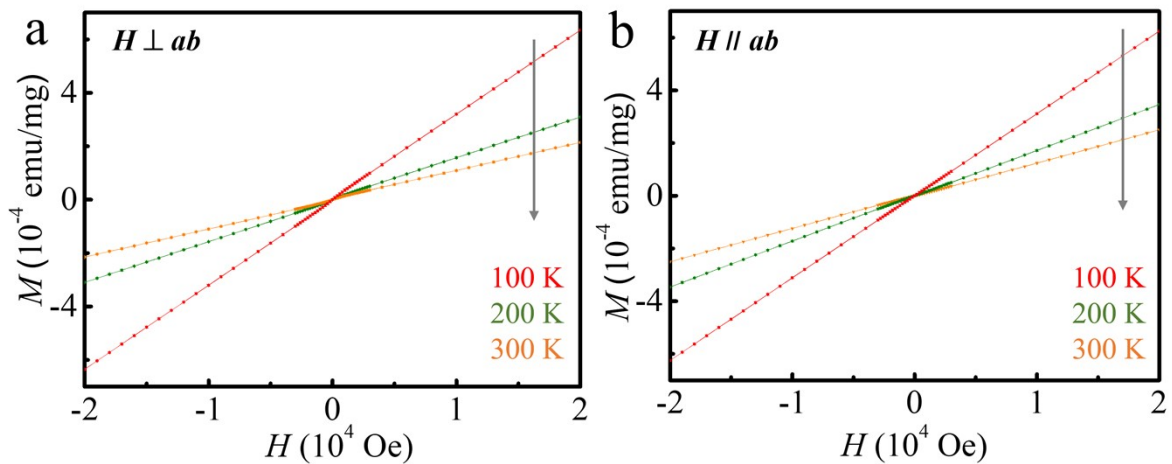
Experimental details and supporting data are available in the online version of the paper.



**Fig. S1** Micrographs of the  $\text{VI}_3$  flakes exfoliated onto  $\text{Si}/\text{SiO}_2$  substrates at different stages of degradation under different condition. (a,b) A flake exposing in air before (a) and after (b) 2 h. (c,d) A flake exposing in air before (c) and after (d) heat treatment at  $180^\circ\text{C}$  for 5 min. (e,f) The  $\text{VI}_3$  flakes exposing in air before (e) and after (f) being soaked in acetone for 5 min. (g,h) The  $\text{VI}_3$  flakes exposing in air before (g) and after (h) being soaked in ethanol for 5 min. (i,j) The  $\text{VI}_3$  flakes exposing in air before (i) and after (j) being soaked in water for 5 min.



**Fig. S2** (a-d) SEM images of the suspended  $\text{VI}_3$  nanocrystals on carbon-coated copper grids prepared using acetone (a), ethanol (b), and water (c,d).



**Fig. S3** (a,b) Magnetic hysteresis loops measured at  $T = 100, 200,$  and  $300$  K for  $H \perp ab$  (a) and  $H // ab$  (b).