Supporting information

The infrequent example of hybrid chalcogenoarsenates(III) incorporating trivalent vanadium complexes

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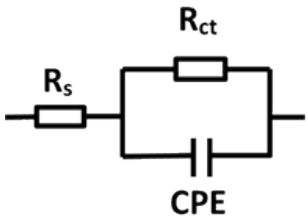
Electrochemical characterizations

The working electrodes for photocurrent measurements were prepared by following processes. 8 mg of microcrystal sample was dispersed into a mixed solution of ethanol (2 mL) and Nafion (50 μL), followed by ultrasonic treatment for 0.5 h. Then, 120 μL of the above slurry was coated onto the FTO glass (F-doped SnO_2) with an effective area of 1 cm^2 and dried naturally at room temperature. The photocurrent experiment was performed on a CHI760E electrochemistry workstation in a three-electrode system, with the sample coated FTO glass as the working electrode, a Pt slice as the auxiliary electrode and an Ag/AgCl as the reference electrode. The supporting electrolyte solution was 0.5 $mol \cdot L^{-1}$ Na_2SO_4 aqueous solution (40 mL). A 450 W high pressure Xe lamp with 420 nm was used as the illumination source. The lamp was

kept on continuously, and a manual shutter was used to block exposure of the sample to the light. The sample was typically irradiated at intervals of 50 s. Electrochemical impedance spectroscopy (EIS) was made in a frequency ranging from 10^5 Hz to 0.01 Hz. The experimental data were fitted with the equivalent circuit diagram by ZSimpWin software, where Rs is the solution resistance, CPE is the constant phase element, and Rct is the charge transfer resistance.



The equivalent circuit diagram

Table S1 Rs, CPE, and Rct values of **1-5**.

Compound	visible-light or Without	R_s(Ω)/error(%)	CPE(S-sec^n)/error (%)	Freq power/error (%)	R_{ct}(Ω)/error (%)
1	visible-light	27.69/0.90	5.25×10^{-5}/1.19	0.89/0.31	4.41×10^4/1.71
	Without visible-light	27.61/0.75	5.66×10^{-5}/0.93	0.89/0.25	5.37×10^4/1.55
2	visible-light	25.16/1.34	6.56×10^{-5}/1.63	0.88/0.60	2.05×10^4/1.63

	Without visible-light	25.70/0.74	6.88×10^{-5}/0.87	0.82/0.24	4.87×10^{4}/1.63
	visible-light	28.53/1.17	4.77×10^{-5}/1.28	0.82/0.35	8.62×10^{4}/2.73
3	Without visible-light	28.27/1.19	5.05×10^{-5}/1.28	0.83/0.35	9.95×10^{4}/3.08
	visible-light	22.72/0.64	7.26×10^{-5}/0.94	0.86/0.24	1.77×10^{4}/1.03
4	Without visible-light	22.75/0.98	7.03×10^{-5}/1.31	0.87/0.34	3.04×10^{4}/1.91
	visible-light	21.47/0.77	5.52×10^{-5}/1.12	0.89/0.27	2.21×10^{4}/1.20
5	Without visible-light	21.56/0.96	5.24×10^{-5}/1.23	0.88/0.32	3.82×10^{4}/1.81

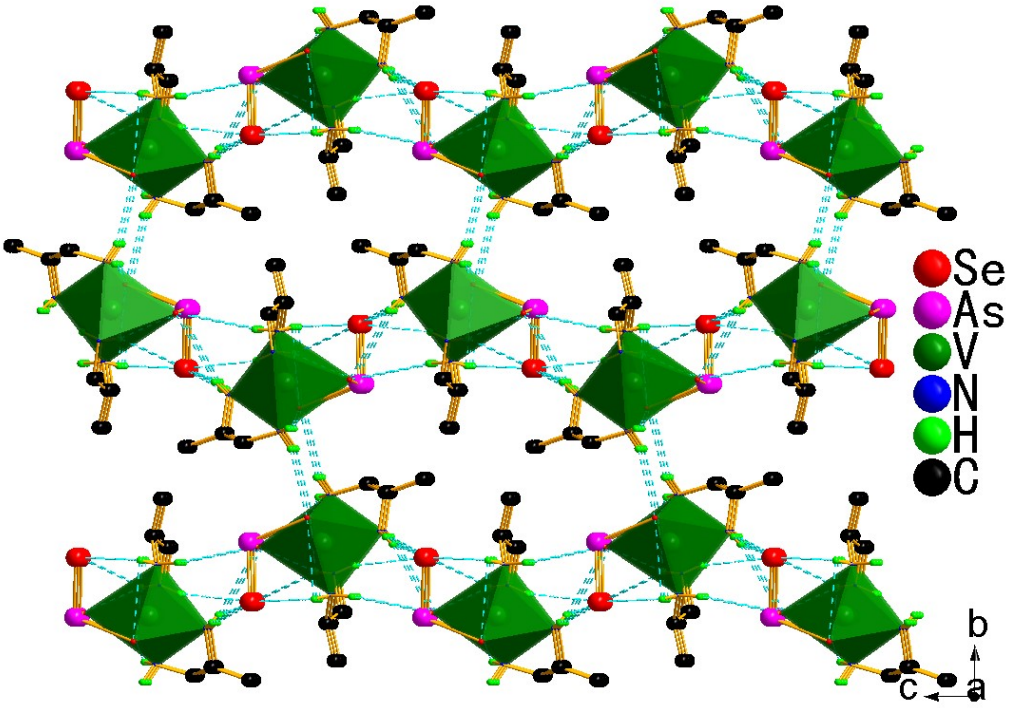


Fig. S1 3-D H-bonding network structure of **2**.

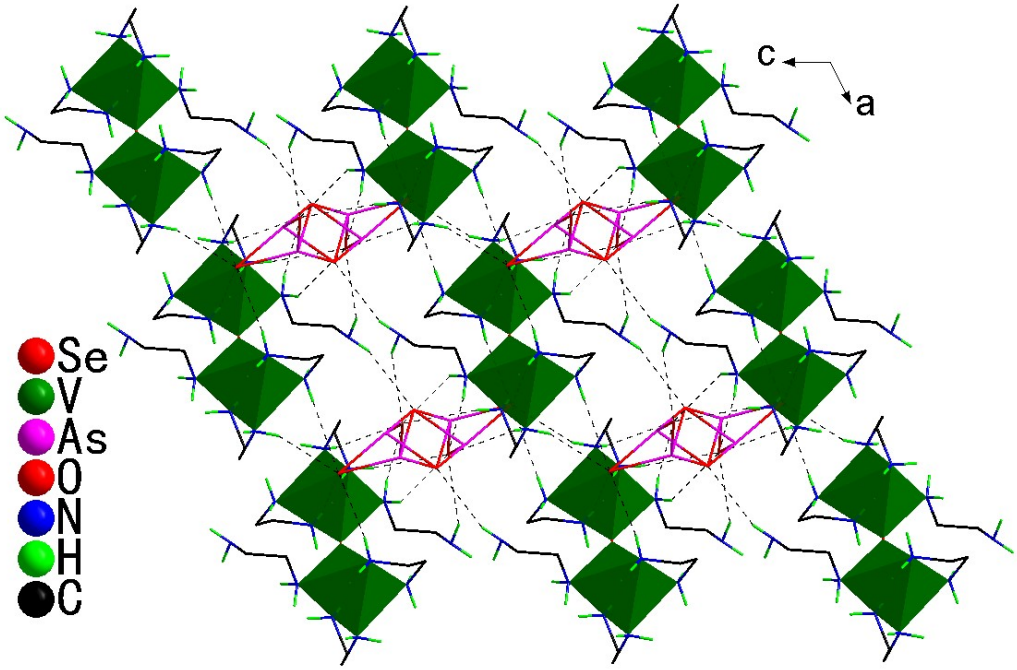
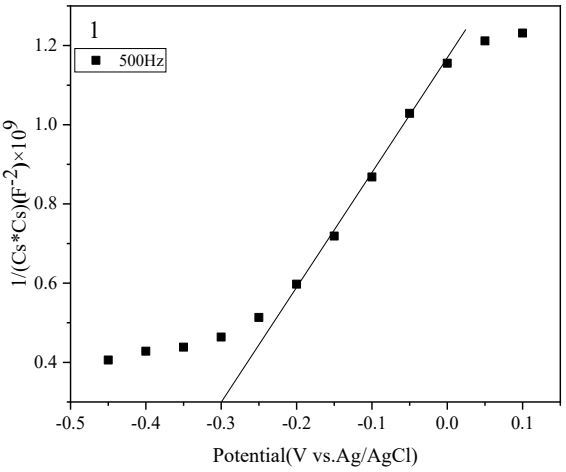
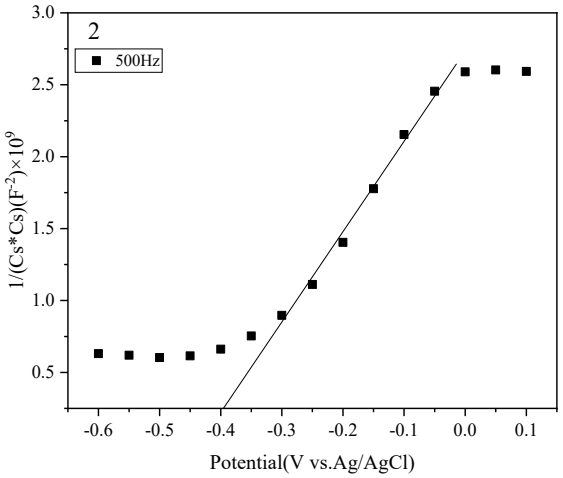
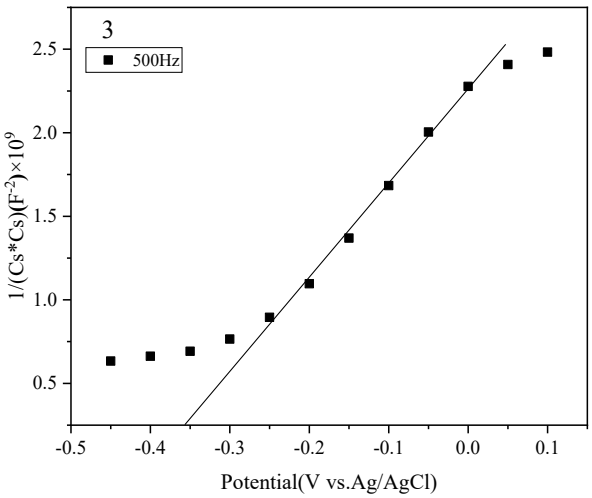
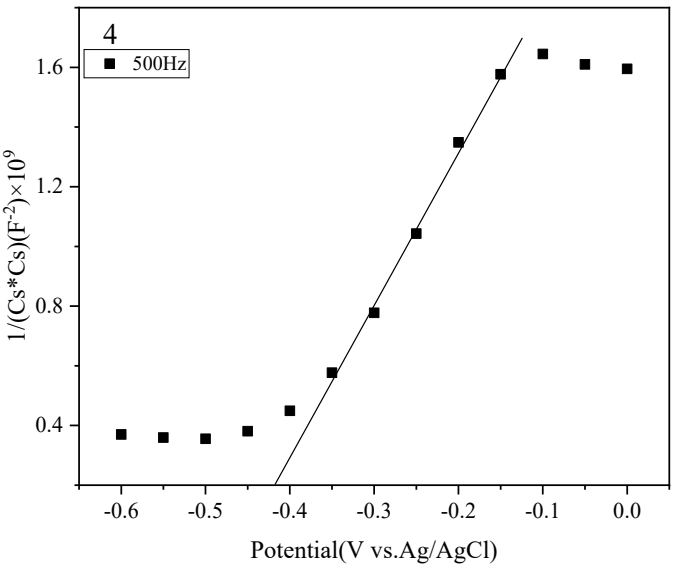


Fig. S2 the 3-D H-bonding network structure in **5**.


1
500Hz
1/(Cs*Cs)(F^{-2})×10^{9}
1.2
1.0
0.8
0.6
0.4
-0.5
-0.4
-0.3
-0.2
-0.1
0.0
0.1
Potential(V vs.Ag/AgCl)


2
500Hz
1/(Cs*Cs)(F^{-2})×10^{9}
3.0
2.5
2.0
1.5
1.0
0.5
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0.0
0.1
Potential(V vs.Ag/AgCl)


3
500Hz
1/(Cs*Cs)(F^{-2})×10^{9}
2.5
2.0
1.5
1.0
0.5
-0.5
-0.4
-0.3
-0.2
-0.1
0.0
0.1
Potential(V vs.Ag/AgCl)



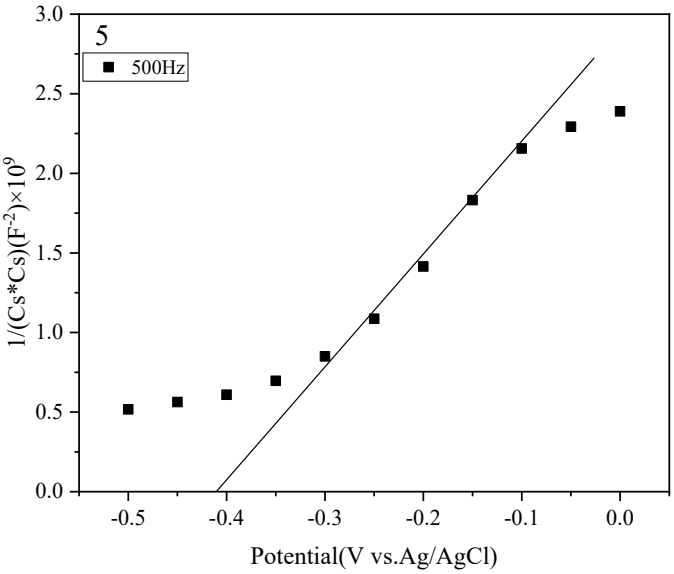


Fig. S3 Mott-Schottky plots of **1-5**.

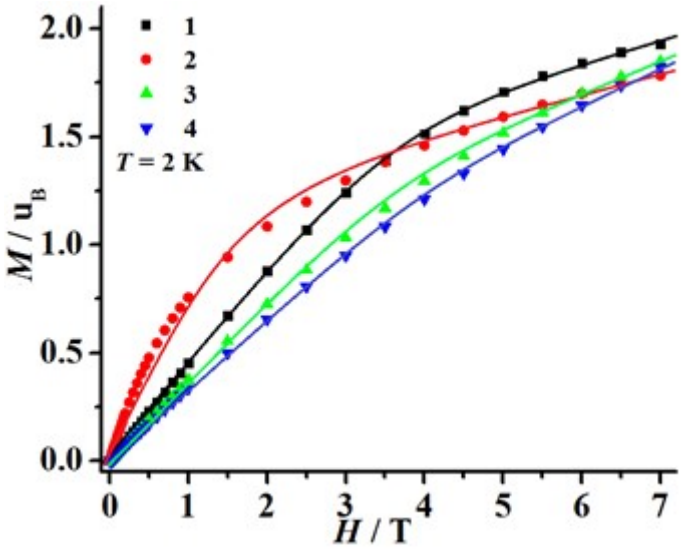


Fig. S4. *M-H* for **1-4** at 2 K and best fit (solid lines).

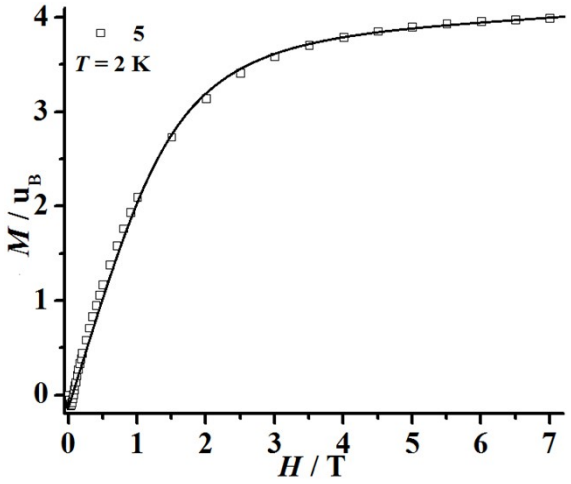


Fig. S5. *M-H* for **5** at 2 K and best fit (solid lines).

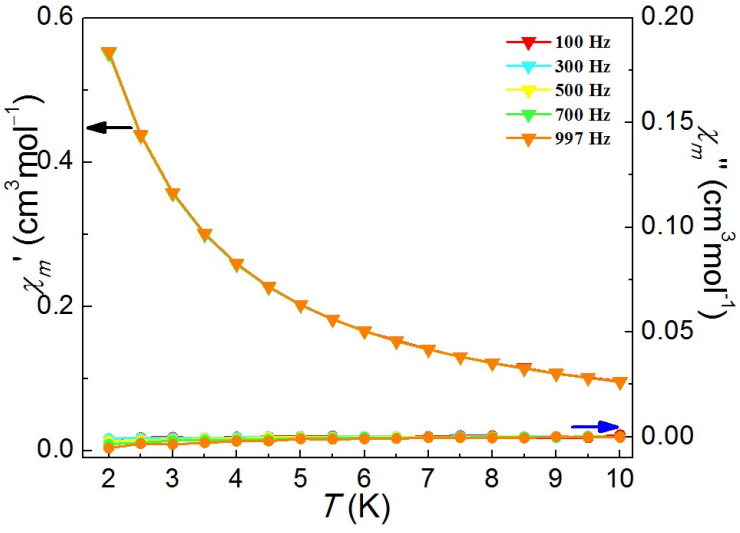
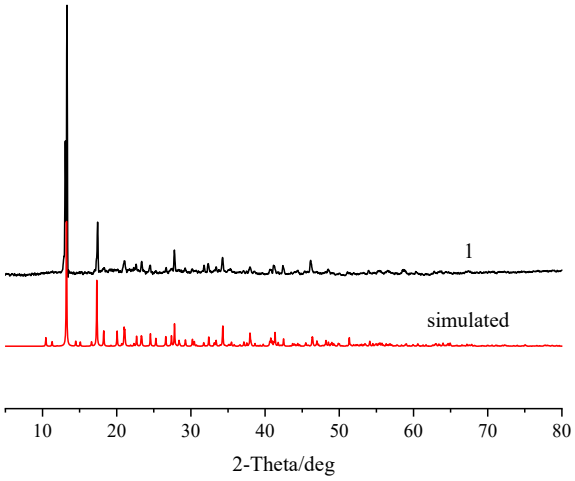
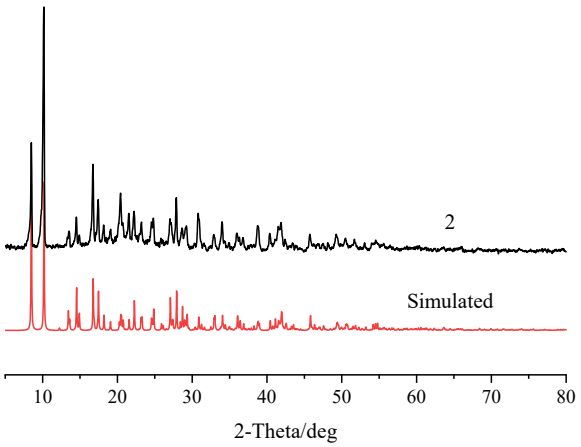
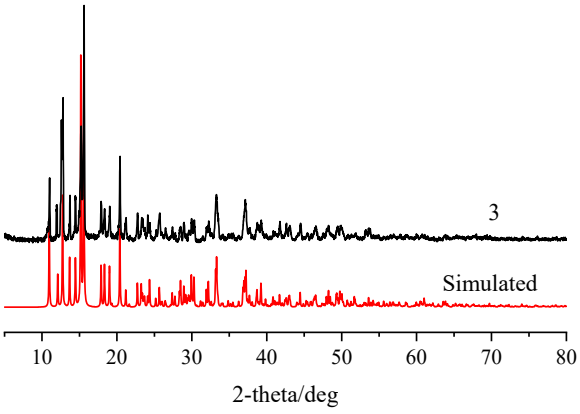


Fig. S6. Temperature-dependent χ' and χ''AC susceptibilities under 0 Oe DC fields for **5**.


1
simulated
10
20
30
40
50
60
70
80
2-Theta/deg


2
Simulated
10
20
30
40
50
60
70
80
2-Theta/deg


3
Simulated
10
20
30
40
50
60
70
80
2-theta/deg

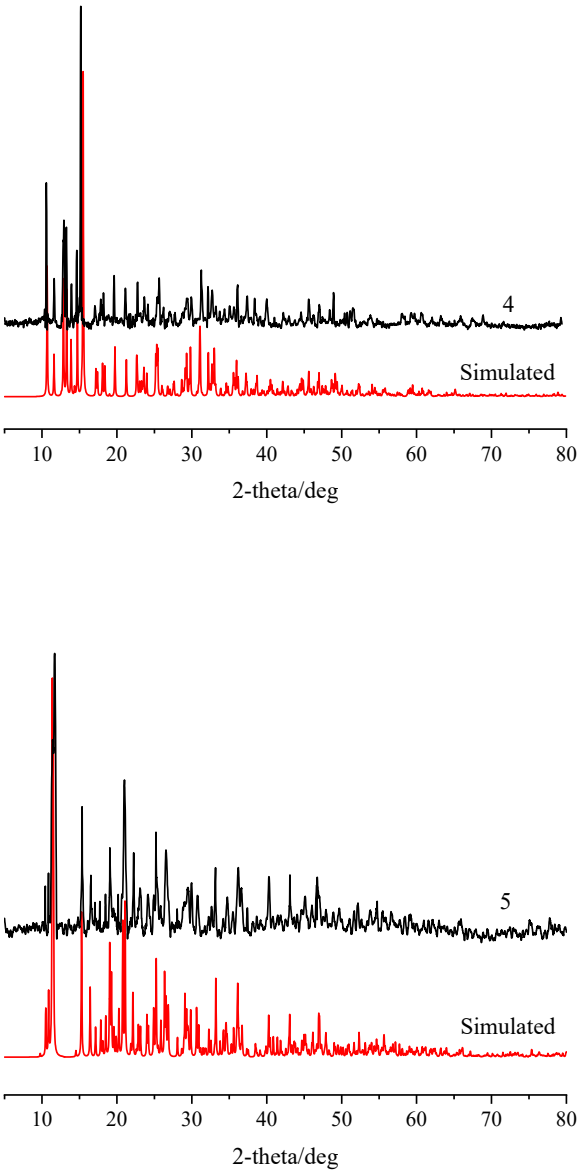


Fig. S7 Simulated, experimental and after immersed XRD patterns of **1-5**.

Fig. S8 the three-electrode system and the photoelectric properties measurement setup

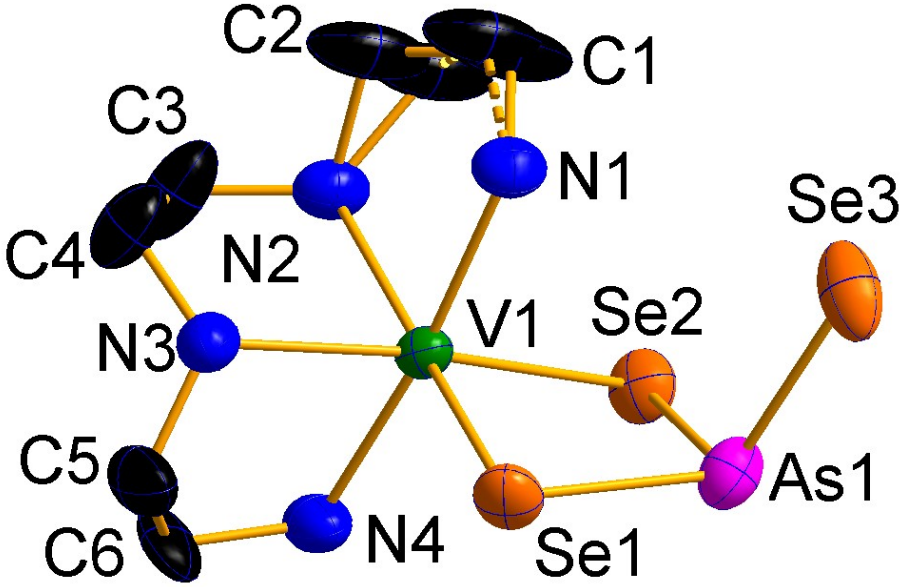


Fig. S9 The crystal structure of **4**. All H atoms bonded to C and N atoms are omitted for clarity.