Electronic Supplementary Material (ESI) for CrystEngComm.

Supporting information

Mesoporous V_2O_5/Ketjin black nanocomposites for their all-solid-state symmetric supercapacitors

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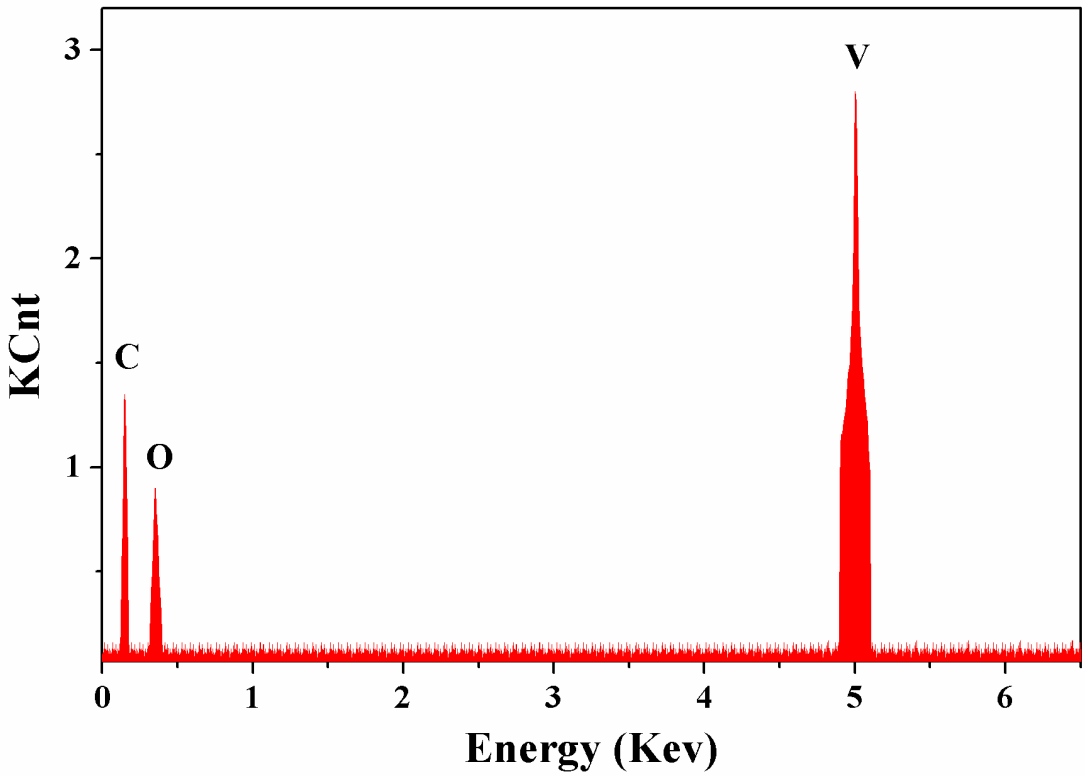

Fig. S1 EDX spectrum of the VK2 nanocomposites.

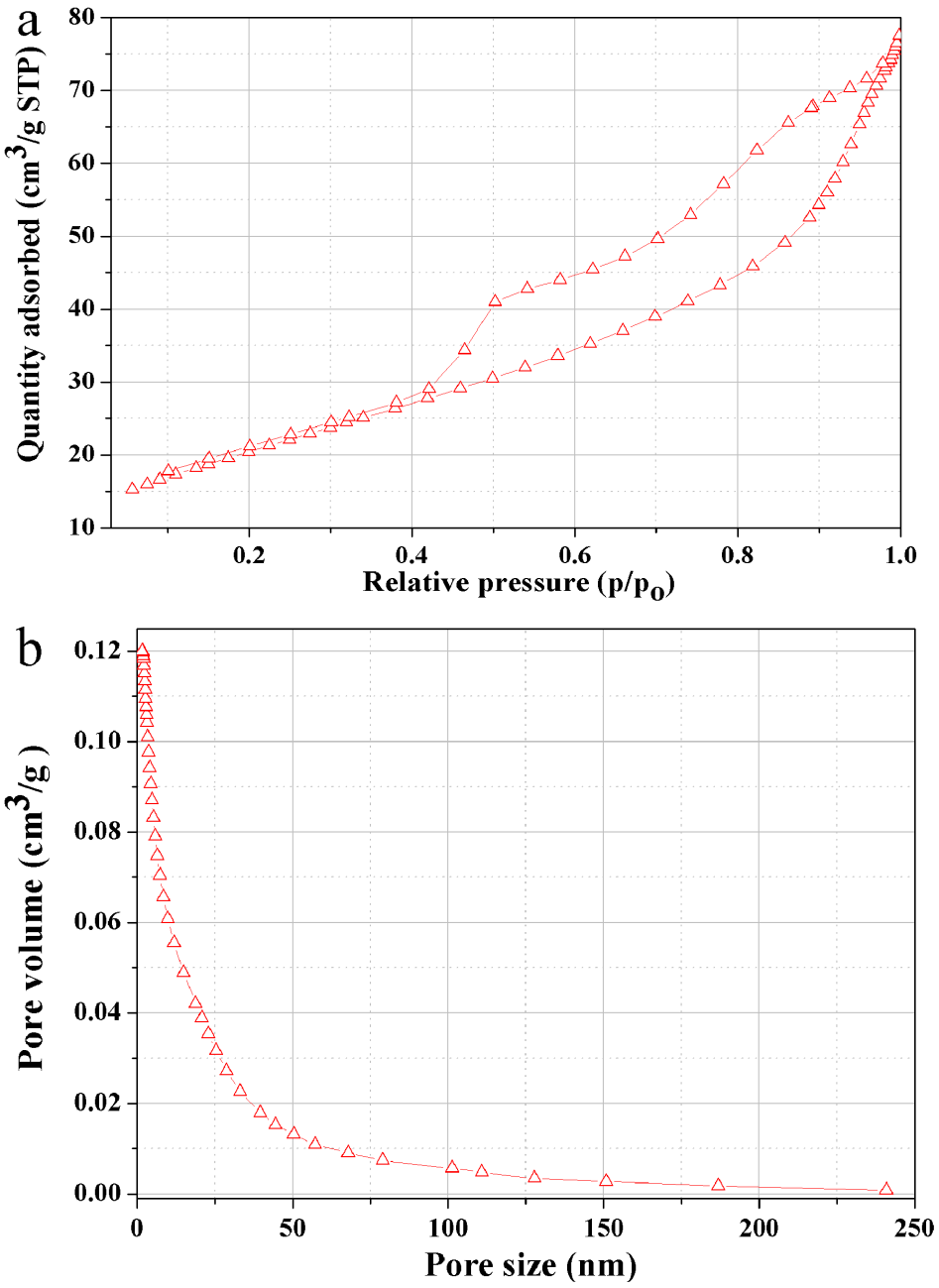

Fig. S2 (a) N_2 adsorption-desorption isotherm and (b) the pore size distribution of VK2.

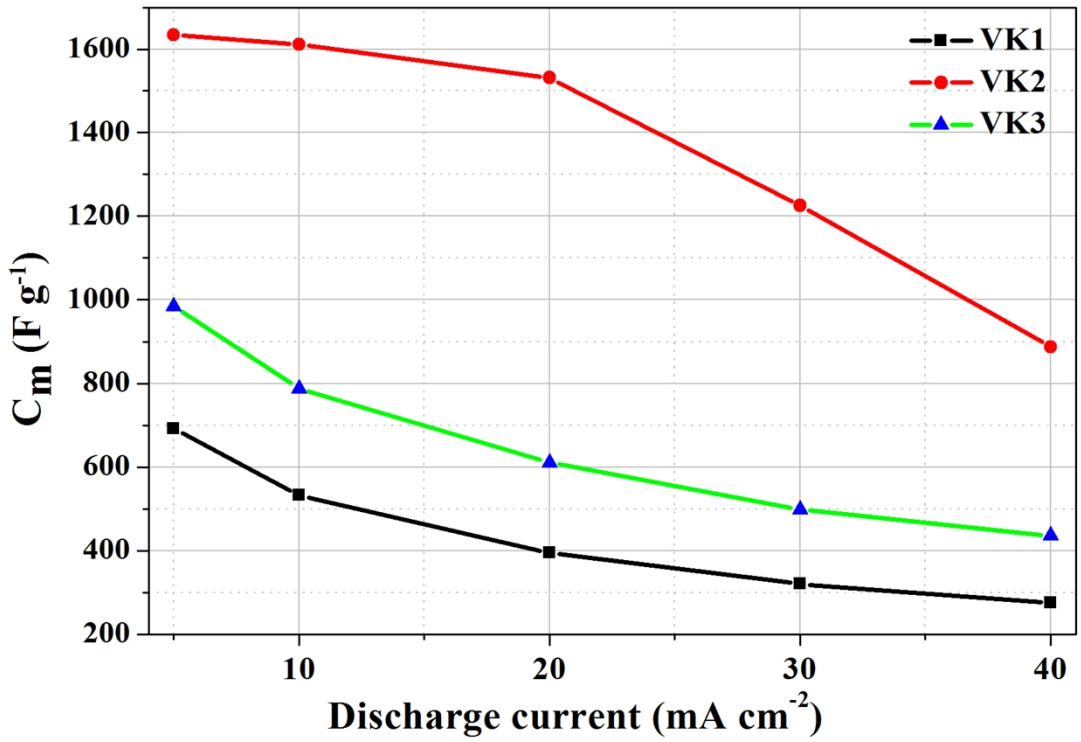

Fig. S3 Specific capacitance (C_m) for VK1, VK2, VK3.

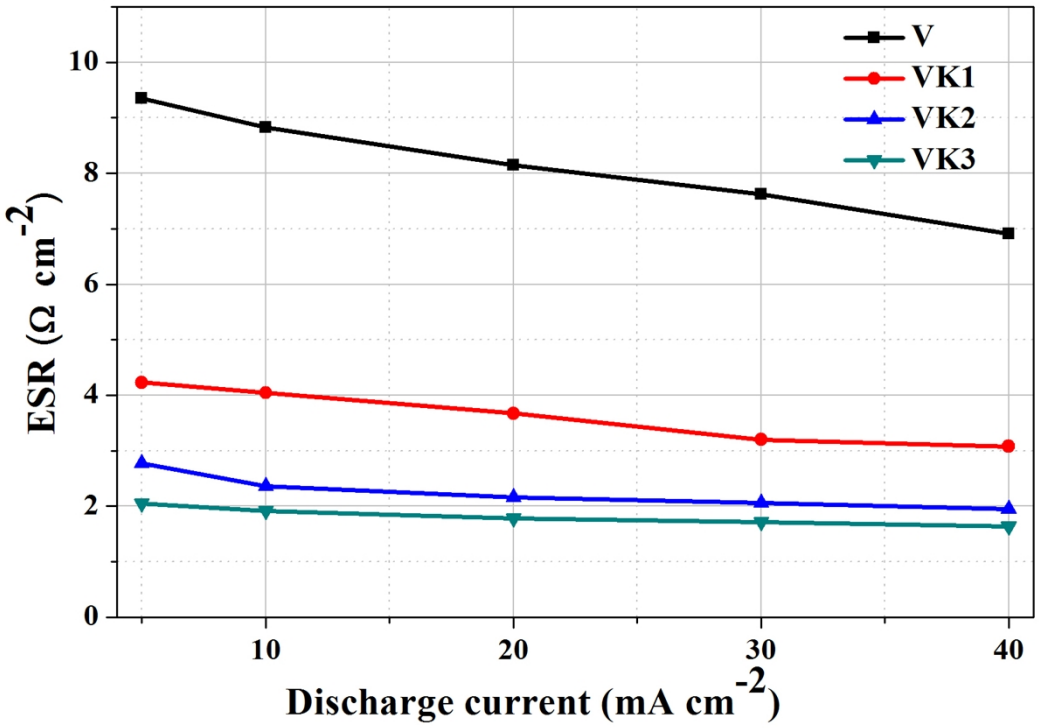

Fig. S4 ESR versus discharge density for V, VK1, VK2, VK3.

Tab. S1. BET Surface area and mesoporosity of V, VK1, VK2, VK3, m-KB.

Sample	S_{BET} [m^2g^{-1}]	S_{meso}[m^2g^{-1}]	V_{total}[cm^3g^{-1}]	Pore size(nm)
V	15.1457±0.82	15.566±0.87	0.0463 ±0.0023	9.1402
VK1	22.0668±1.11	22.057±1.05	0.0472 ±0.0021	8.5796
VK2	74.8399±3.36	71.158±3.14	0.1221±0.0043	6.8840
VK3	264.7151±9.26	260.148±9.06	0.4944±0.0222	6.9983
m-KB	1504.2048±75	1346.426±67	3.2962±0.1153	9.8786

S_{meso}, mesoporous surface area; V_{total}, total volume.

Tab. S2 Comparision of the electrochemical performance of the V_2O_5/carbon composites

Composites	Synthesis method	Specific capacitance ($F\ g^{-1}$)	Cycle retention
V_2O_5/carbon nanofiber [15]	Electrospun	150 $F\ g^{-1}$ (1 mA cm^{-2}, 6M KOH)	89% (100 cycles)
V_2O_5/mesoporous carbon [25]	Ultrasonic	124 $F\ g^{-1}$ (0.2 A g^{-1}, 1M KNO_3)	——
V_2O_5/MWCNT[13]	Solution based approach	510 $F\ g^{-1}$ (1mV s^1, 2M KCl)	96% (5000 cycles)
V_2O_5/graphene[27]	Hydrothermal	195.4 $F\ g^{-1}$ (1 A g^{-1}, 0.5 M K_2SO_4)	——
V_2O_5/CNT[12]	Hydrothermal	48.5 $F\ g^{-1}$ (0.5A/g, 0.1 M LiTFSI)	75% (100 cycles)
V_2O_5/CNT[7]	Hydrothermal	47.21 $F\ g^{-1}$ (100 mV/s, 0.1 M KCl)	——

Tab. S3 Resistance value for V, VK1, VK2, VK3 measured by EIS.

Sample	R_e(Ω)	R_{ct}(Ω)
V	0.84	8.25
VK1	0.68	3.55
VK2	0.55	1.60
VK3	0.46	1.51

Tab. S4 The energy density and power density for the supercapacitors based on VK1, VK2, VK3, respectively.

Sample	Energy density ($Wh\ kg^{-1}$)	Power density ($kW\ kg^{-1}$)	Corresponding current ($mAcm^{-2}$)
VK1	24.07073	0.30512	5
	18.51073	0.61024	10
	13.73049	1.22049	20
	11.13695	1.83073	30
	9.56049	2.44098	40
VK2	56.82647	0.32115	5
	56.04289	0.61324	10
	53.27482	1.22942	20
	42.61985	1.8353	30
	30.85600	2.45213	40
VK3	34.24516	0.30291	5
	27.39613	0.60581	10
	21.23705	1.21162	20
	17.31610	1.81743	30
	15.14528	2.42324	40