



Supplementary information

Transition Metal-Doped Layered Iron Vanadate ($\text{FeV}_{3-x}\text{M}_x\text{O}_9 \cdot 2.6\text{H}_2\text{O}$, $\text{M} = \text{Co}, \text{Mn}, \text{Ni}$, and Zn) for Enhanced Energy Storage Properties

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Figure S1. Photographs of synthesized undoped and transition metal-doped FVO samples.

Table S1: Ionic radius and electronegativity values of transition metals

Ions	Fe^{3+}	V^{4+}	Co^{2+}	Mn^{2+}	Ni^{2+}	Zn^{2+}
Ionic radius (nm)	0.069	0.072	0.079	0.081	0.083	0.088
Electronegativity	1.556	1.795	1.321	1.263	1.367	1.336

Table S2: Gibbs formation energy values of the various transition metal oxides (Ref. 32)

Ions	V^{4+}	Co^{2+}	Mn^{2+}	Ni^{2+}	Zn^{2+}
Gibbs formation energy (kJ mol^{-1})	-717.6	-214	-362.9	-211.7	-320.5

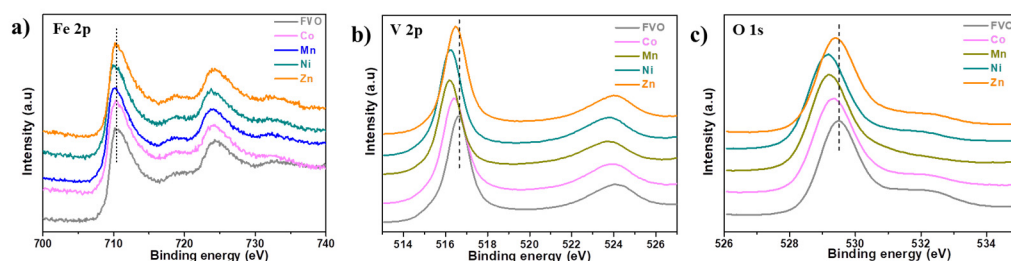


Figure S2. XPS peaks of (a) Fe 2p, (b) V 2p and (c) O 1s; for all samples.

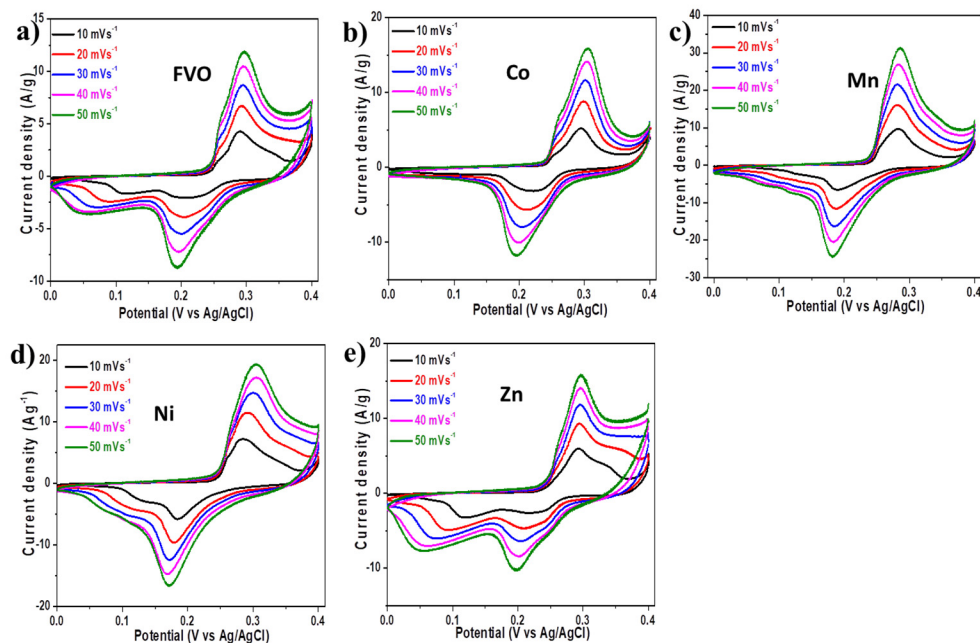


Figure S3. CV curves at various scan rates of; (a) pristine (b) Co-doped (c) Mn-doped (d) Ni-doped and (e) Zn-doped; FVO electrodes.

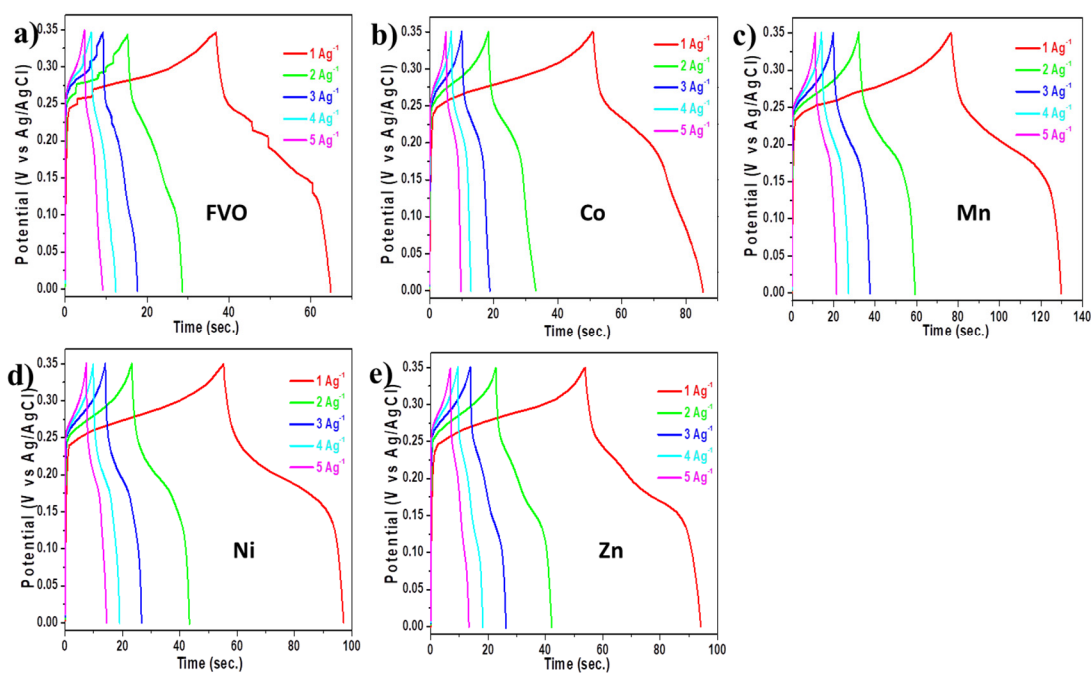


Figure S4. Galvanostatic charge-discharge profiles at various current densities of; (a) pristine (b) Co-doped (c) Mn-doped (d) Ni-doped and (e) Zn-doped; FVO electrodes.

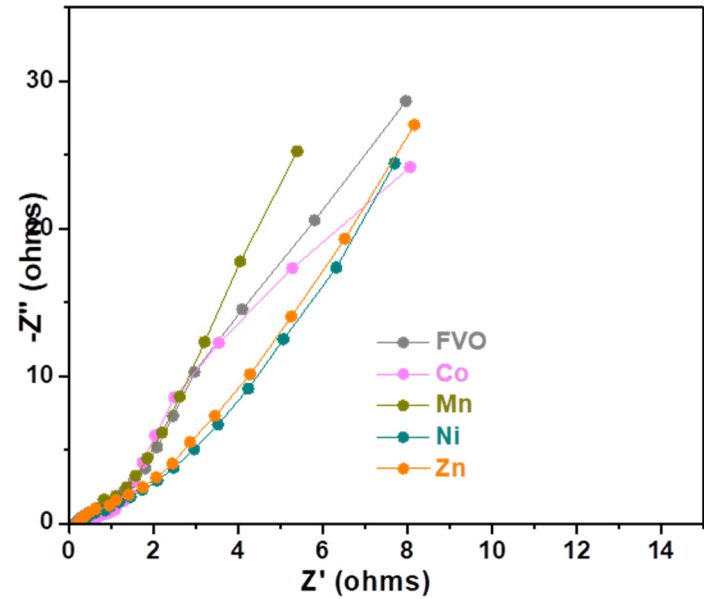


Figure S5. EIS data of all electrodes compared.

Table S3: k1 and k2 values of electrodes obtained from a plot of $i/v^{1/2}$ vs $v^{1/2}$

Electrode	FVO	Co	Mn	Ni	Zn
k1	0.0769	0.0811	0.3407	0.1543	0.1052
k2	1.6518	1.0877	1.9755	1.1805	1.9538

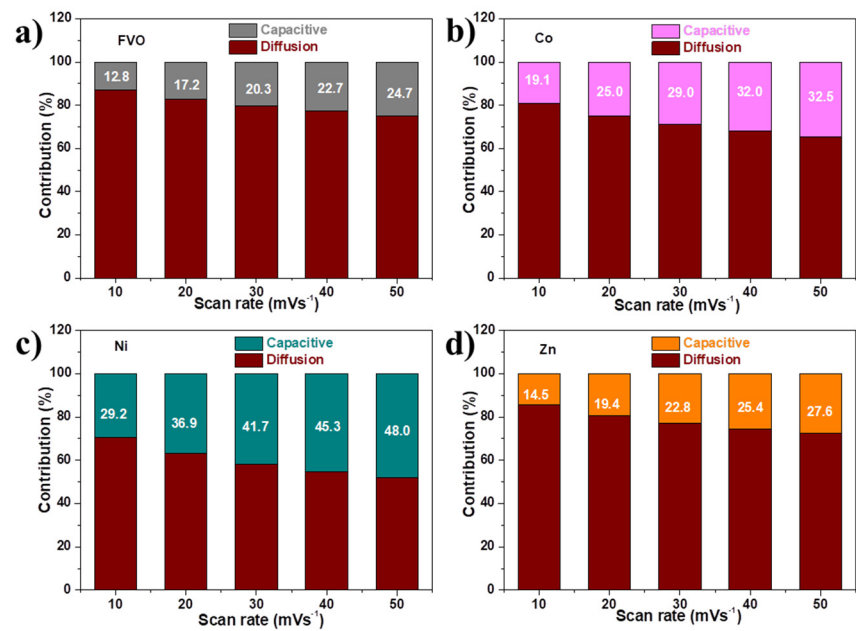


Figure S6. Contribution ratio of capacitive-controlled process to the capacitance of (a) pristine (b) Co-doped (c) Ni-doped (d) Zn-doped; FVO electrodes.