

Supporting Information

External vibrations can destroy the specific capacitance of supercapacitors – From experimental proof to theoretical explanations

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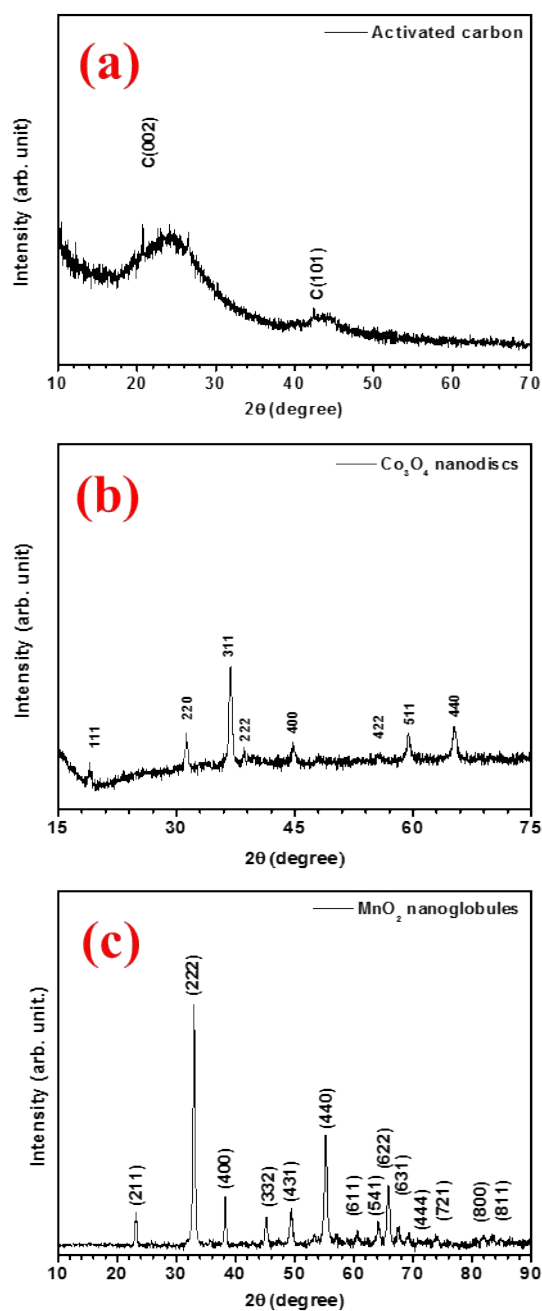


Fig. S1. XRD pattern for (a) activated carbon, (b) Co_3O_4 nanodiscs and (c) MnO_2 nanoglobules, respectively.

XRD analysis of materials: Activated carbon showed two graphitic peak 002 and 101. Co_3O_4 showed crystalline peaks. All the peaks could be indexed using the JCDPS card no. 42-1467 associated with the space group $\text{Fd}\bar{3}\text{m}$ (227). Here $\alpha\text{-MnO}_2$ was synthesized which is indexed with JCPDS card no. 44-141.

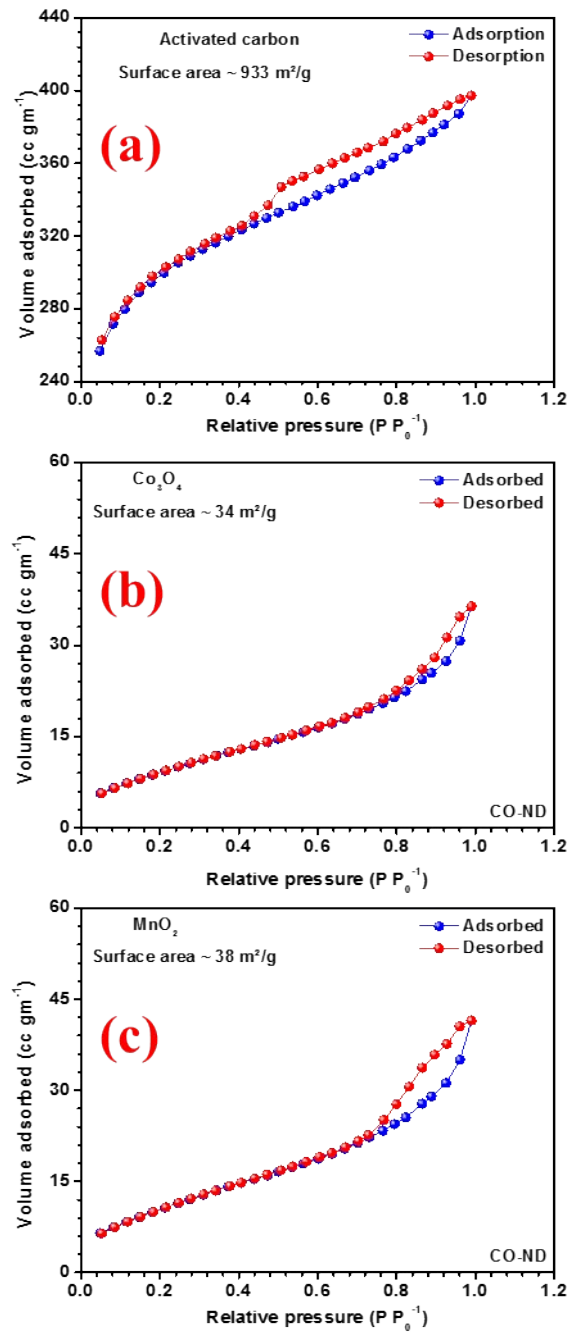


Fig. S2. N_2 adsorption-desorption isotherms for (a) activated carbon, (b) Co_3O_4 nanodiscs and (c) MnO_2 globules, respectively.

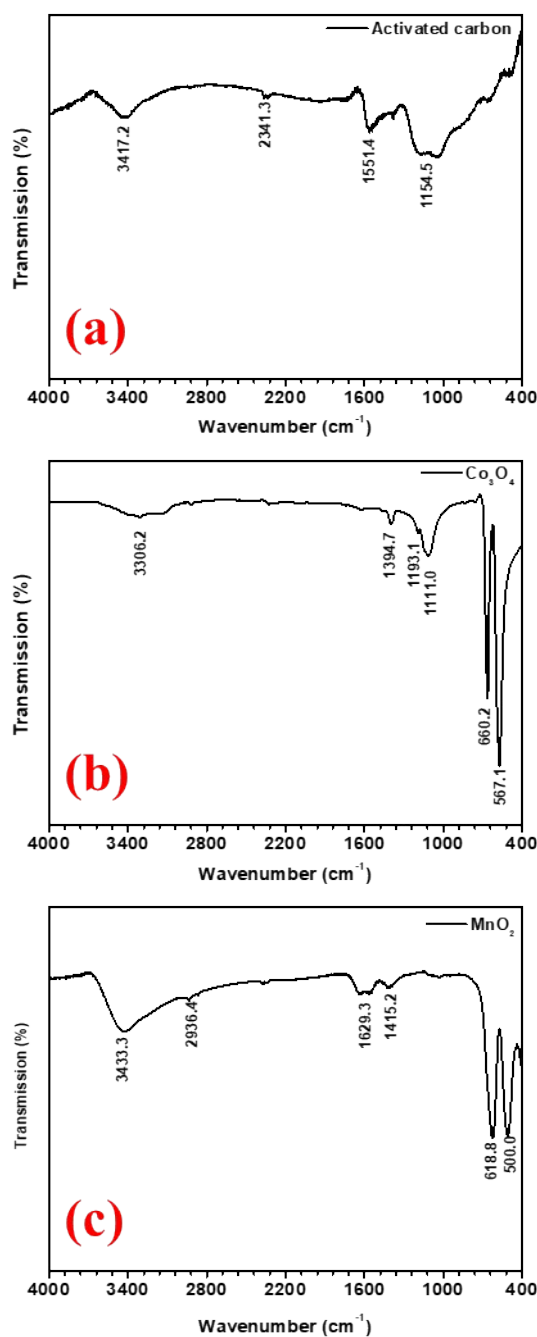


Fig. S3. FTIR spectrum for (a) activated carbon, (b) Co_3O_4 nanodiscs and (c) MnO_2 globules, respectively.

For activated carbon, the absorption band near 3417 cm^{-1} is for the C-OH, 1551 cm^{-1} for C=C, and near 1154.5 for C=O present in the sample. For Co_3O_4 and MnO_2 , the peaks appearing near 3306.2 and 3433.3 cm^{-1} are for the moisture present in the sample. Absorption band near 600.2 cm^{-1} and 567 cm^{-1} in Co_3O_4 is for Co-O bond and similarly in MnO_2 absorption bands present near 618.8 and 500.0 cm^{-1} are for the Mn-O bonds.

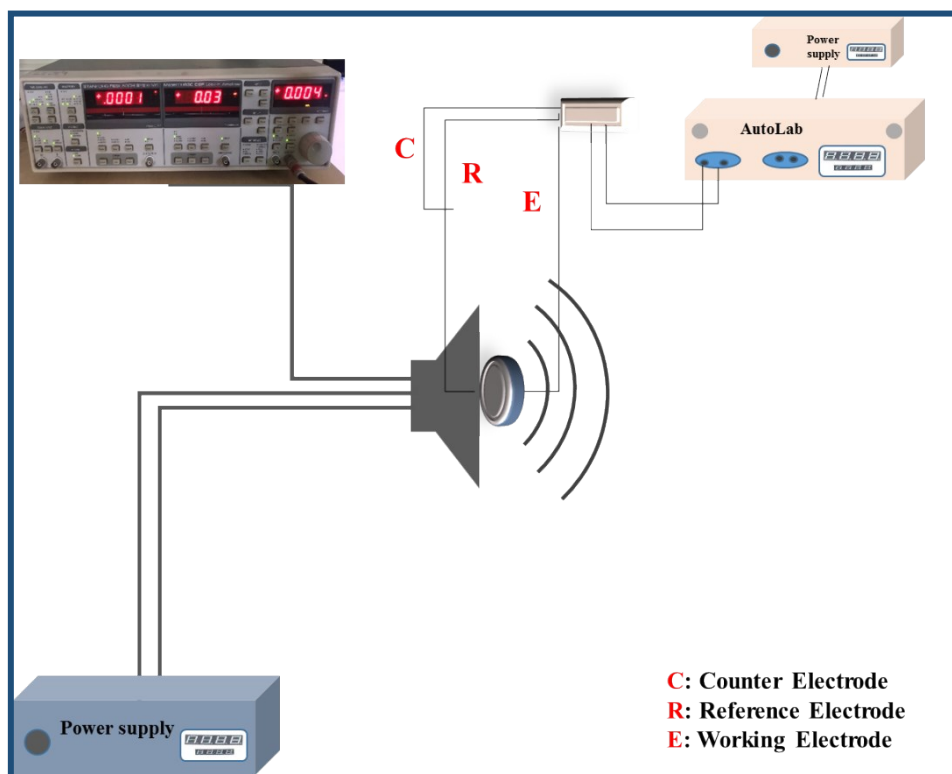


Fig. S4. Schematic of the setup for the measurement of specific capacitance under external frequency.

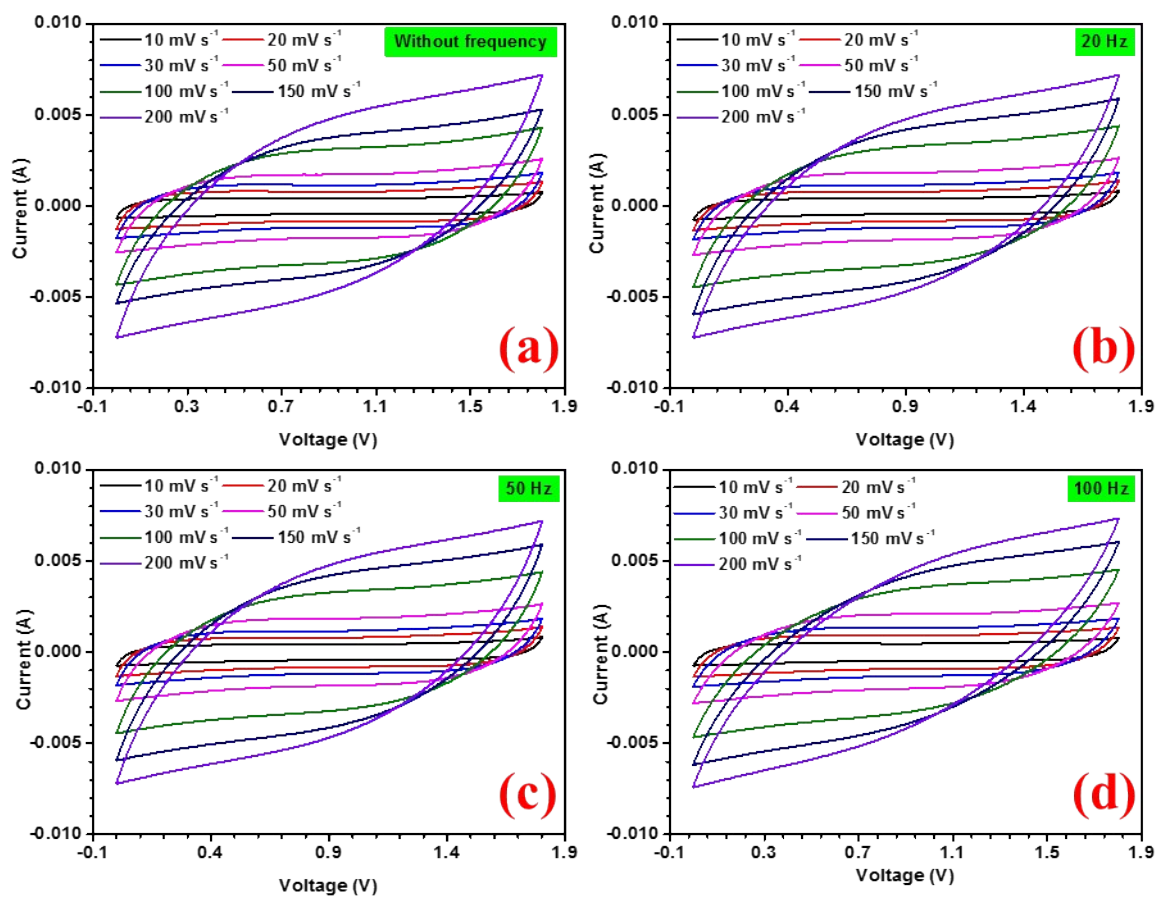


Fig. S5. CV profiles for activated carbon under applied external frequency.

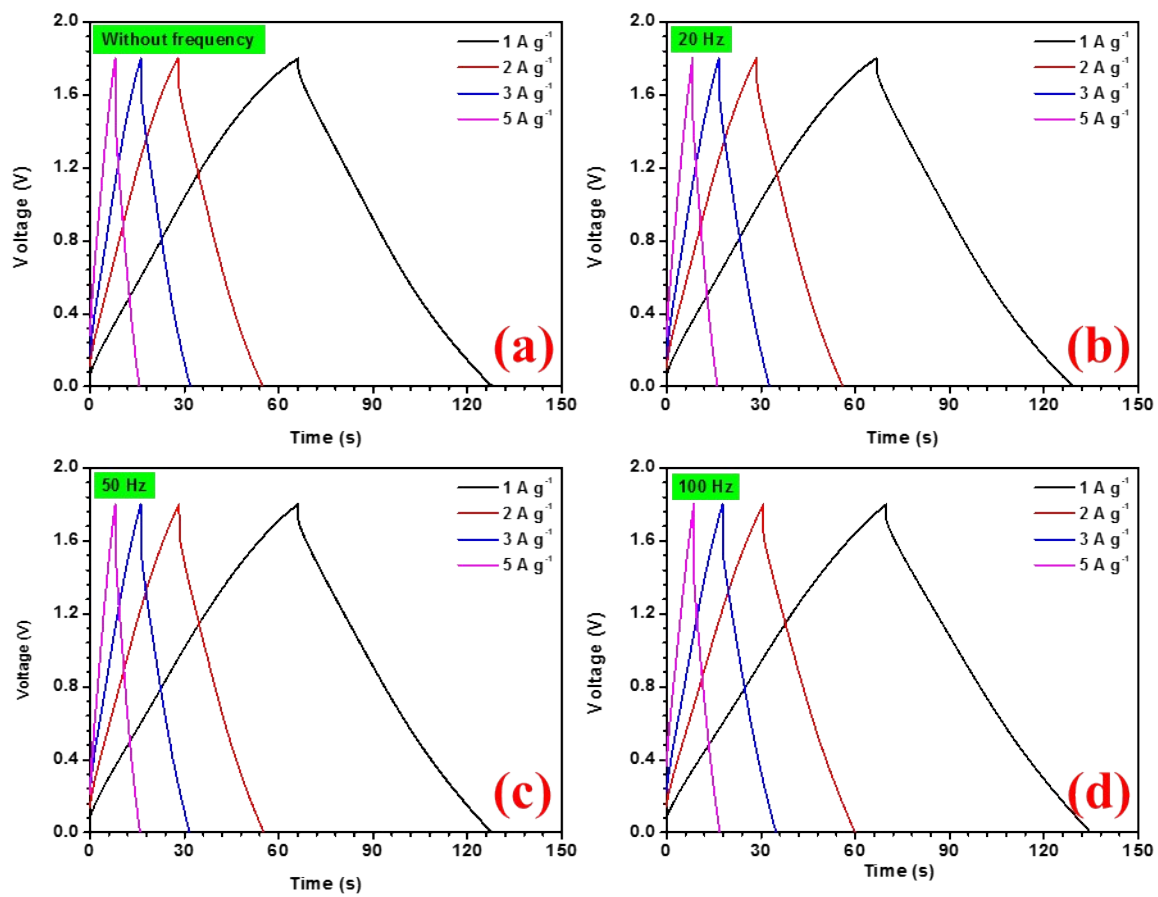


Fig. S6. CD profiles for activated carbon under different applied external frequency.

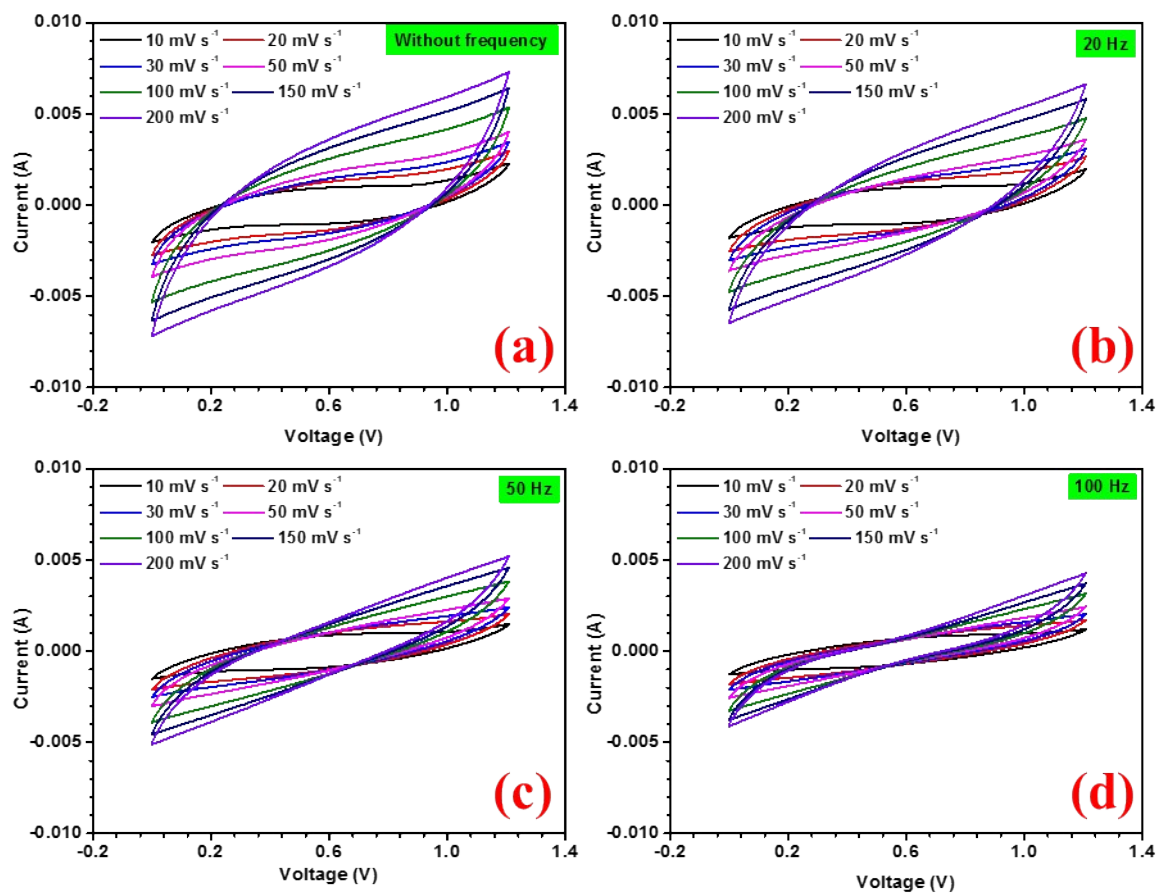


Fig. S7. CV profiles for Co_3O_4 nanodiscs under applied external frequency.

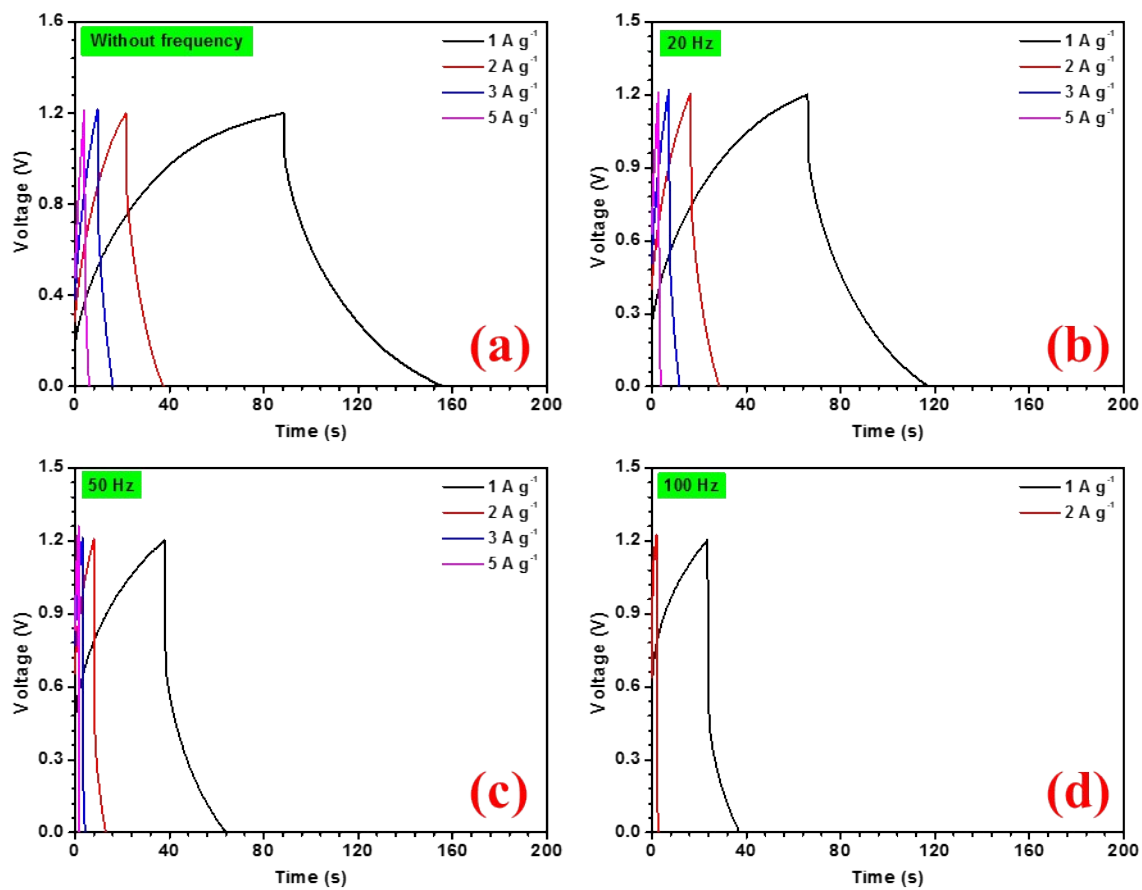


Fig. S8. CD profiles for Co_3O_4 nanodiscs under applied external frequency.

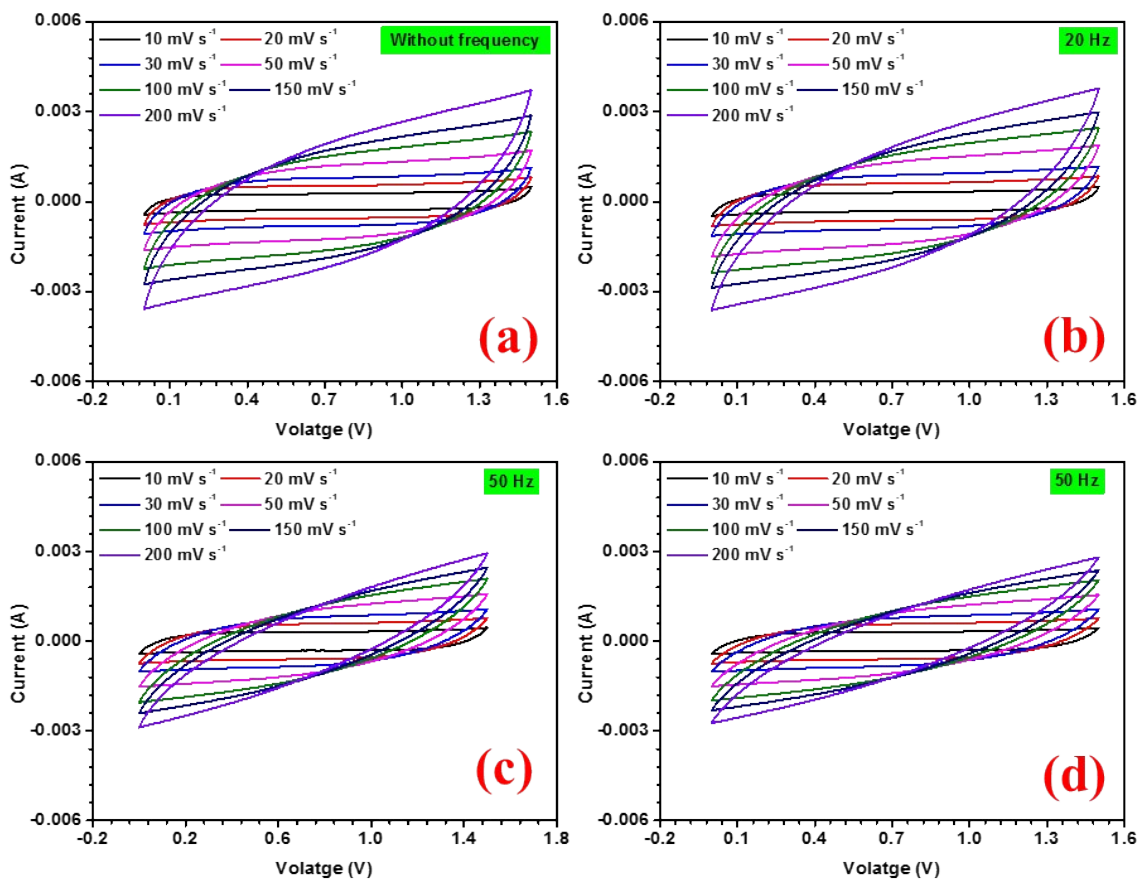


Fig. S9. CV profiles for MnO₂ nanoglobules under external frequency.

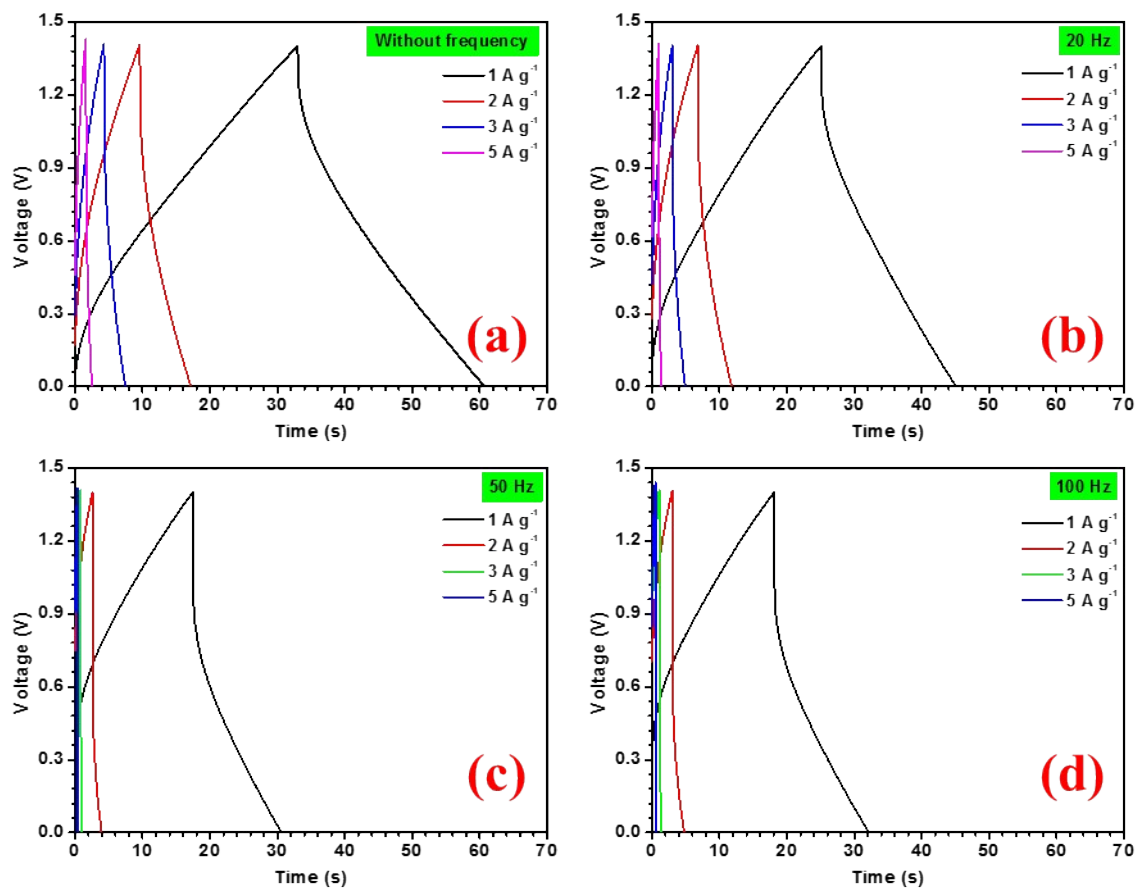


Fig. S10. CD profiles for MnO₂ nanoglobules under external frequency.

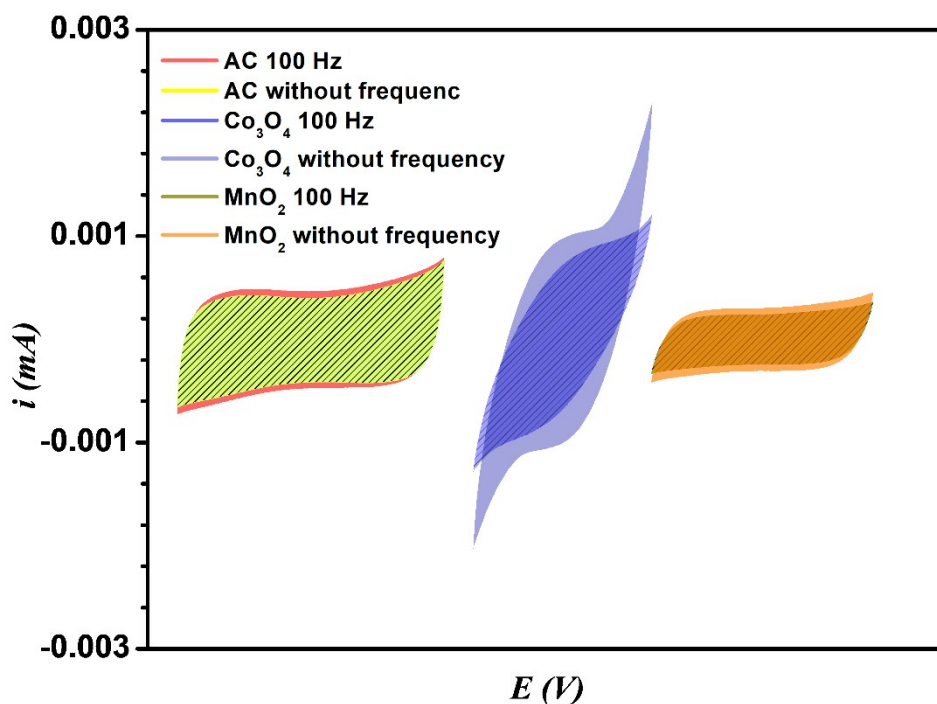


Fig. S11. Comparative CV profiles at 10 mV s^{-1} for the three materials: in absence and presence 100 Hz external frequency.

Tables

Table S1. Specific capacitance values for all material in three electrode configuration at 2 A g^{-1} in variable frequencies.

Material	Voltage window	Specific capacitance (F g^{-1})
Activated carbon	-1 to 0 V	115
Co ₃ O ₄	-0.6 to 0.3 V	178
MnO ₂	-0.2 to 0.6 V	133