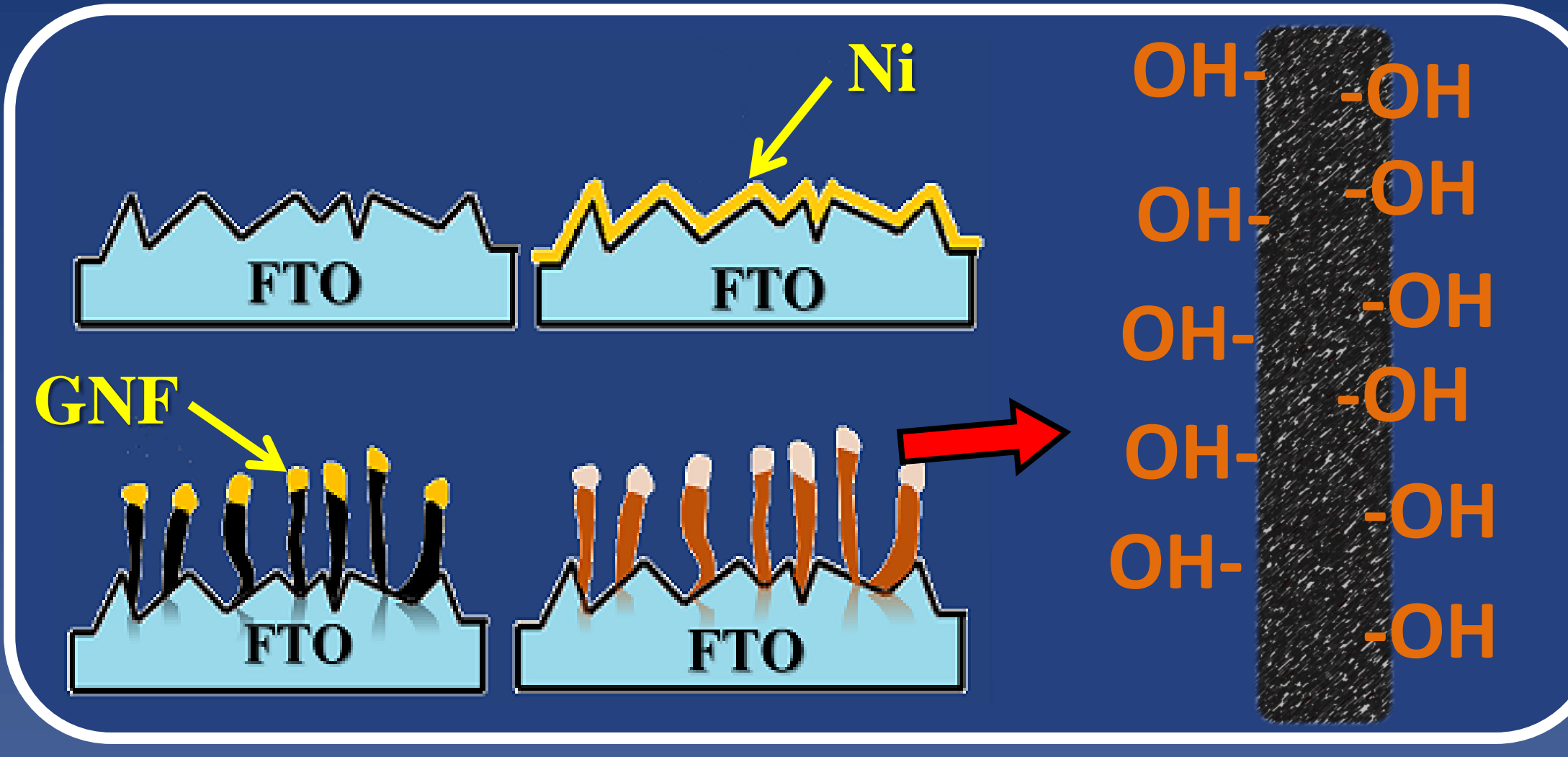


題目：The functionalization of graphitic nanofibers to enhance electrochemical capacitance

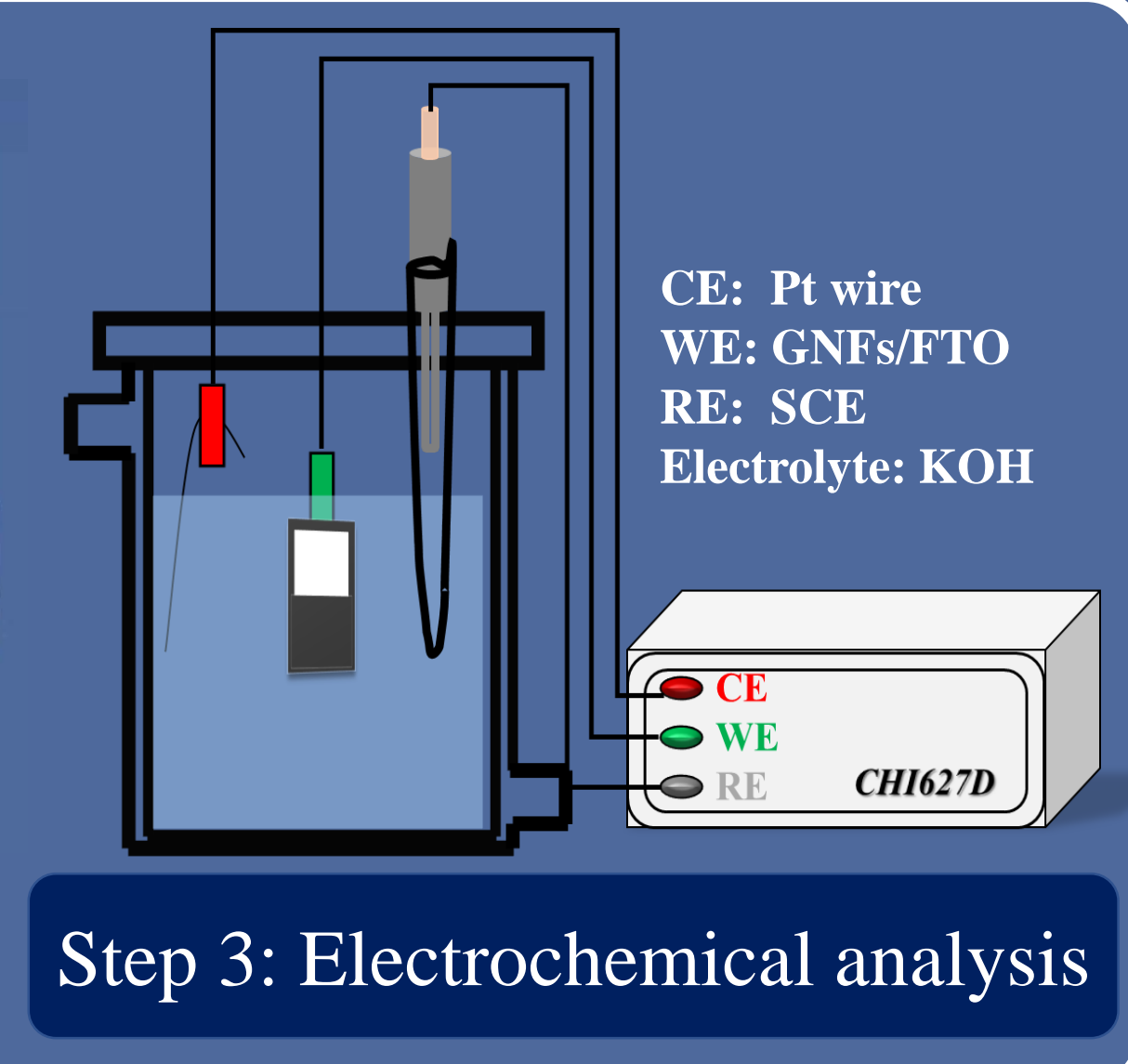
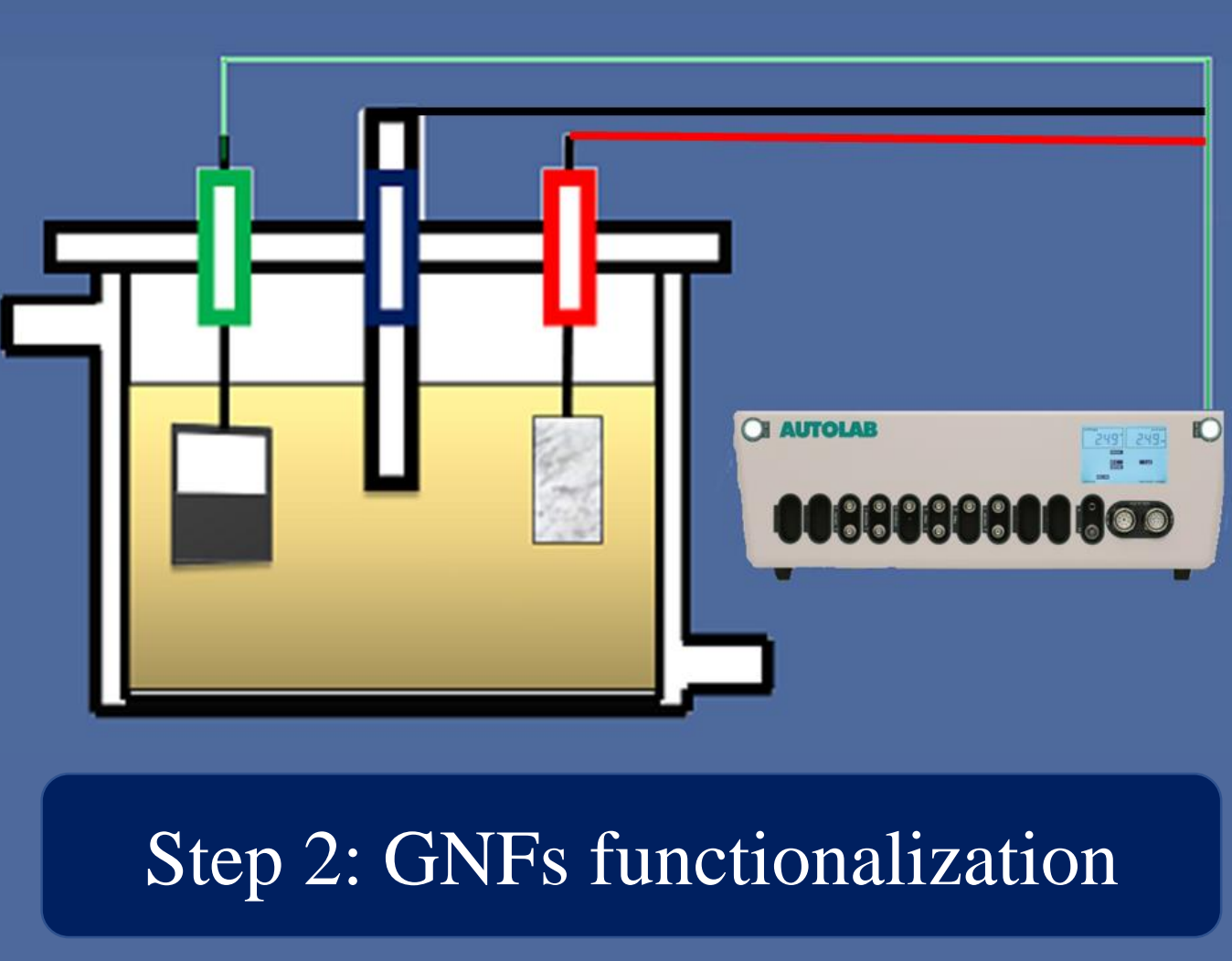
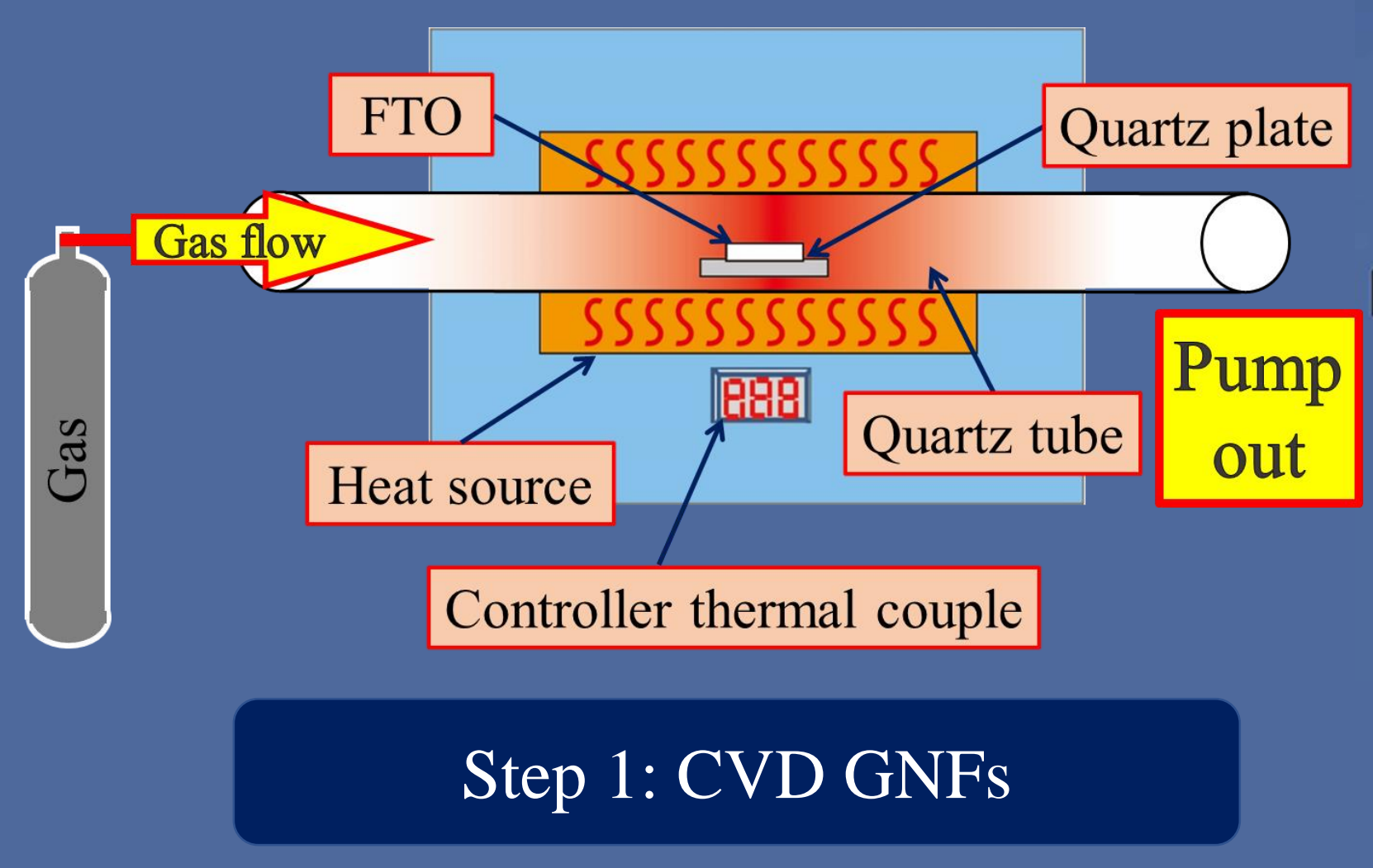
班級/學生：材料四乙/吳昱維、黃士瑋
 指導教授：謝建國

Introduction

An easy electrochemical treatment was applied to functionalize the graphitic nanofibers (GNFs) to enhance the performance of Electric-double capacitance (EDLC). The GNFs directly grown on FTO glass not only avoid the aggregation but also provide the direct transport channel to reduce the internal resistance, therefore display the excellent EDLC behavior. Functionalized GNFs showed strong OH bonds based on the FTIR result to boost the EDLCs due to the OH bonds enhance the contacted surface with electrolyte.



Experimental



Research results

Physical property analysis

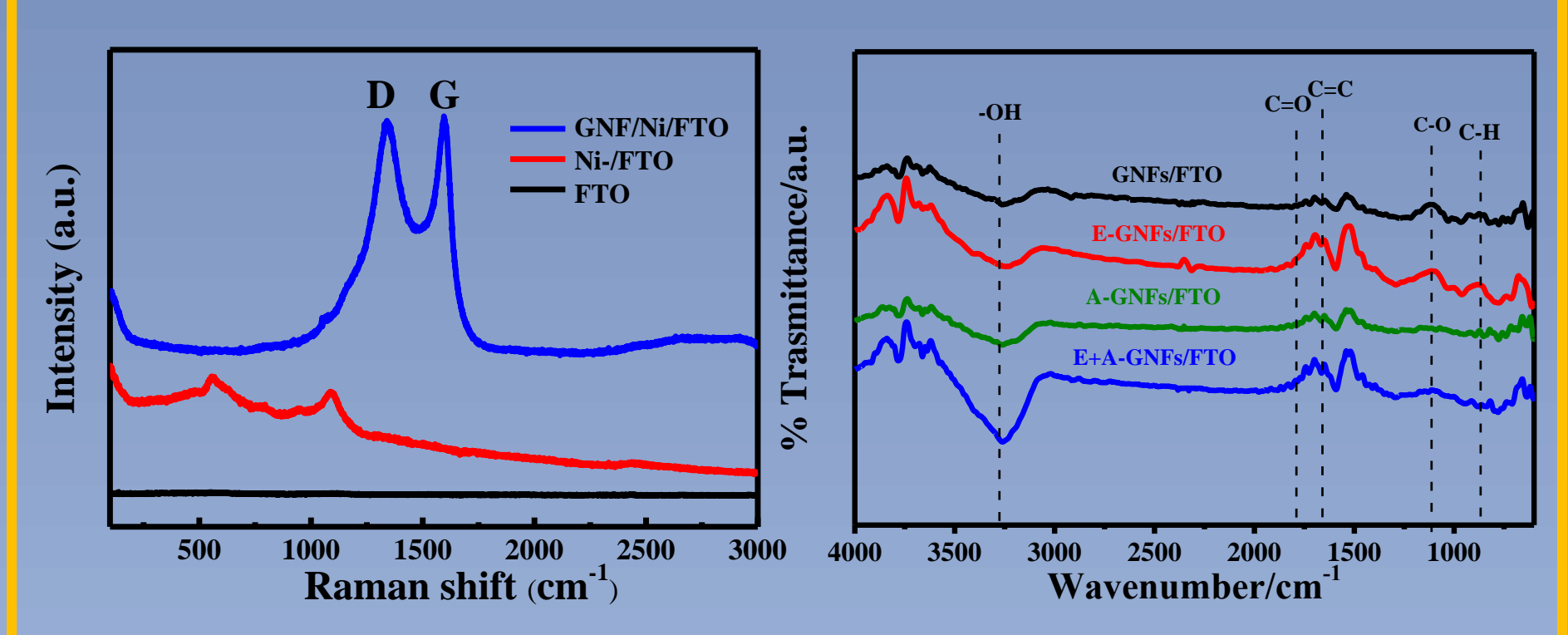


Fig.1 Raman results of the GNFs/Ni/FTO, Ni/FTO, FTO
 Fig.2 Comparison of FTIR of different solutions.

FE-SEM

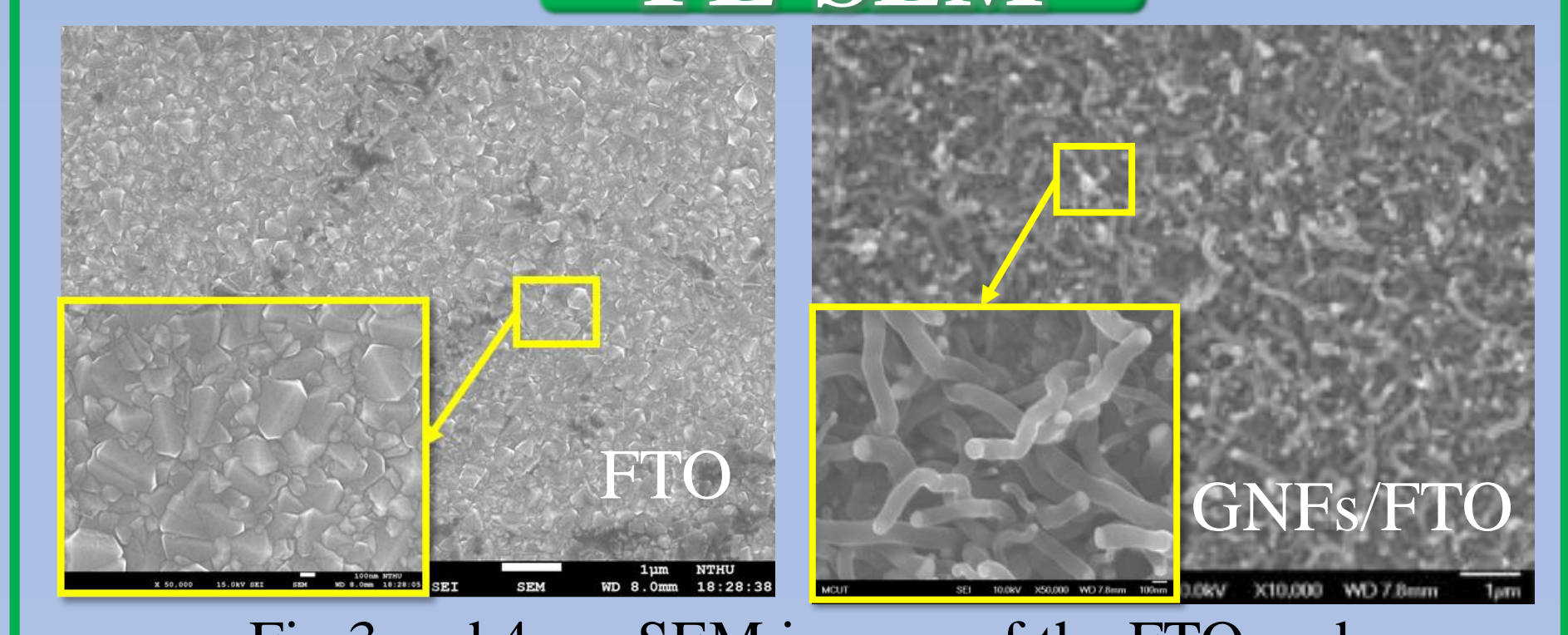


Fig.3 and 4 are SEM images of the FTO and GNFs/FTO, respectively.

Electrochemical performance

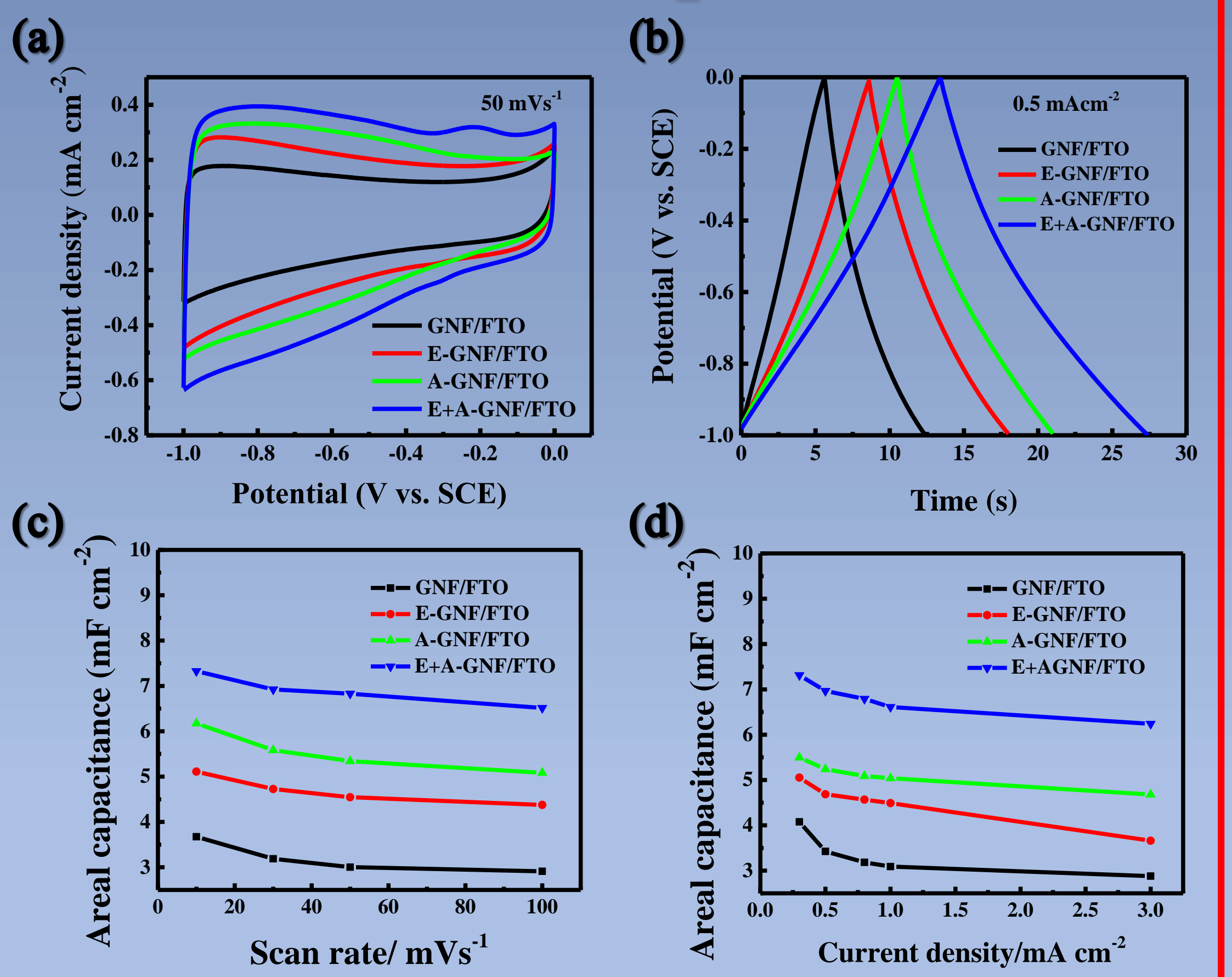


Fig.5 Comparison of (a) CV curves and (b) charge-discharge curves of different samples treated in different solutions. (c) Calculated specific capacitance values under different scan rates. (d) Calculated specific capacitance values under different current densities. (E:Ethanol , A:Acid)

Conclusion

- An easy electrochemical treatment was studied to functionalize carbon-based nanomaterials.
- The functionalized GNFs/FTO were applied as the electrodes for high performance EDLCs.
- FTIR results demonstrated that the electrochemical treatment boosted the OH bonds on the GNFs which enhanced the capacitance of EDLCs.
- The functionalized-GNFs showed excellent rate capabilities under high scan rates and charge current densities.