

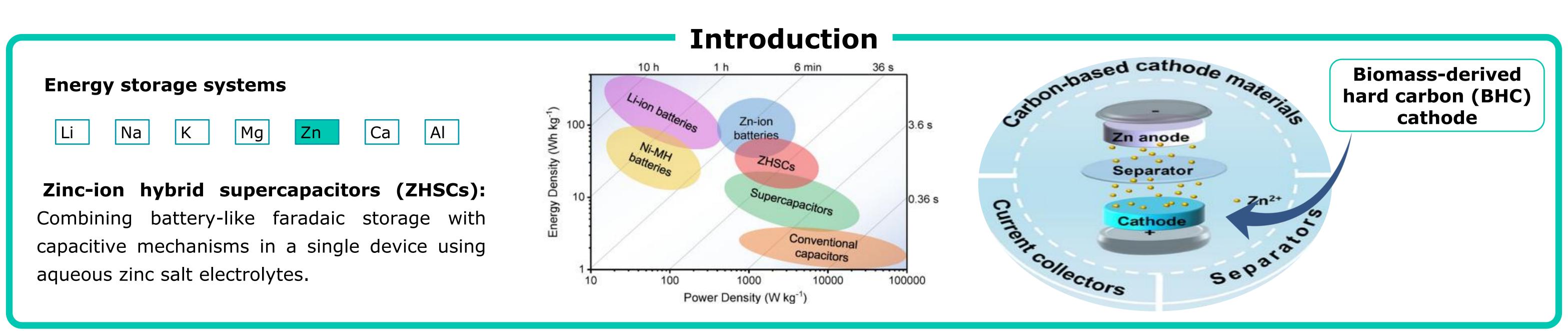




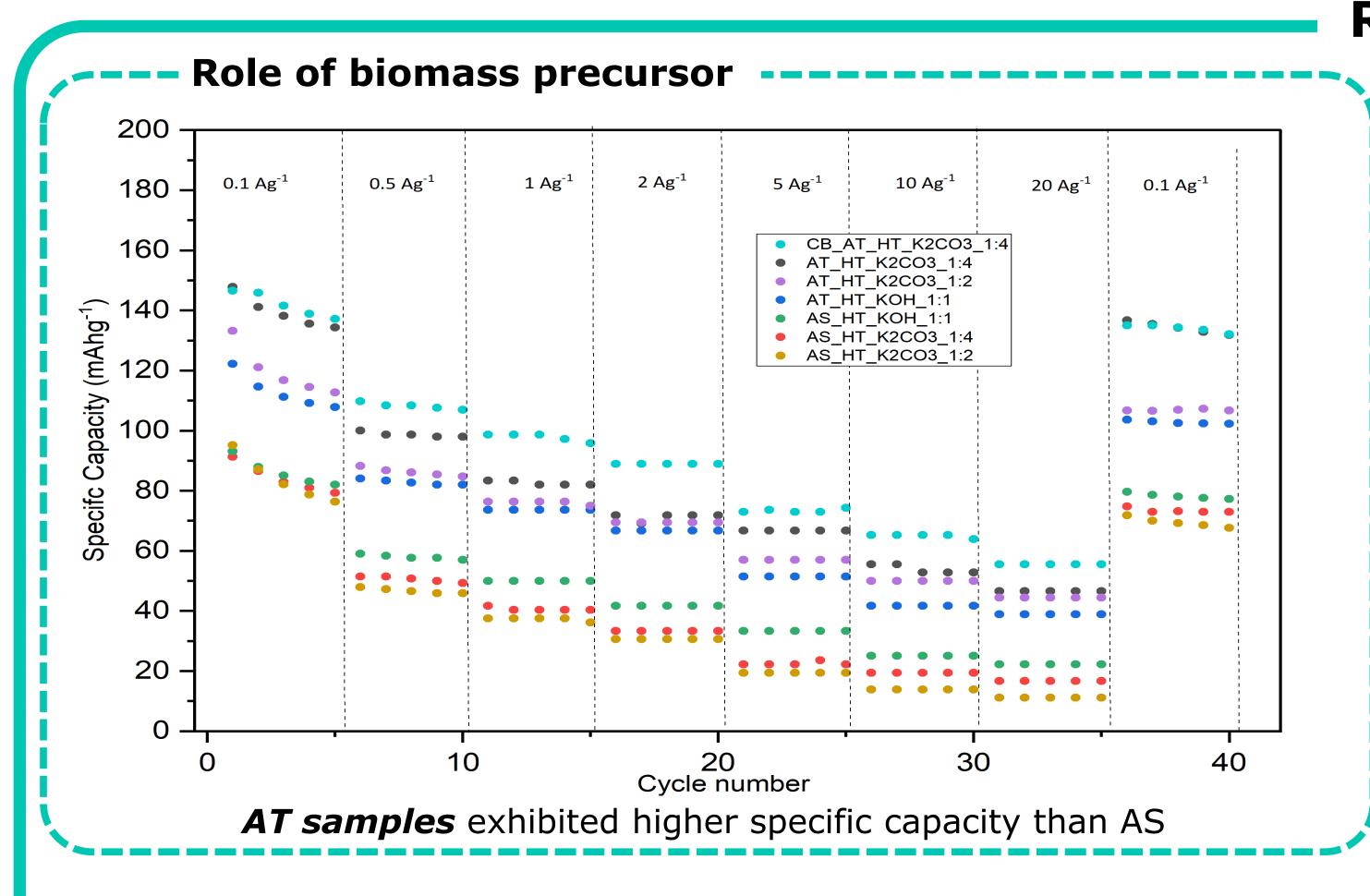
Synthesis of affordable activated carbons from almond shell and almond tree pruning waste for aqueous zinc hybrid supercapacitors

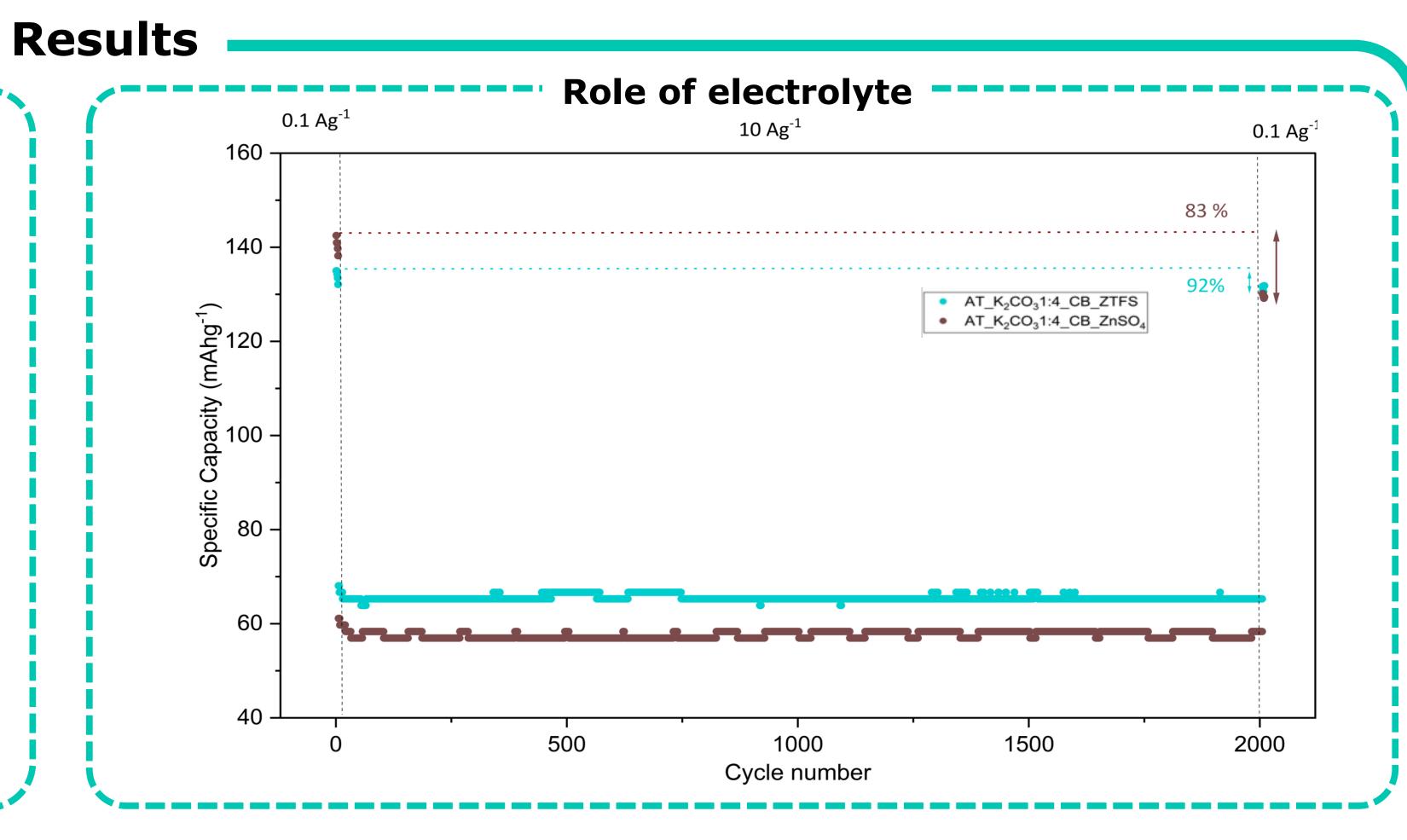
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Synthesis process and conditions Almond shell (AS) Grinding and sieving AT HZO @ 180°C, 12 h ROH Hard carbon Hard carbon HC electrodes

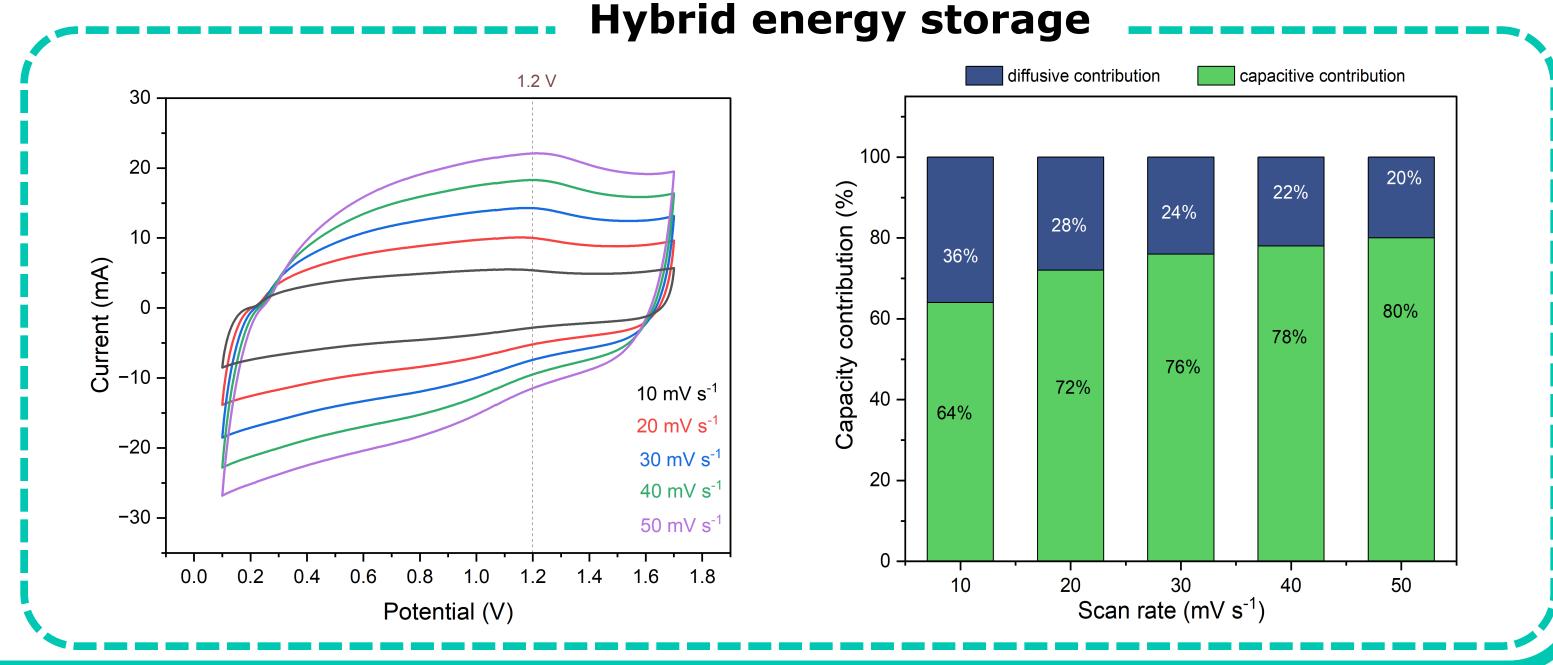




Role of activation conditions

The best-performing sample was **CB_AT_HT_K2CO3_1:4**: HC with HTC pretreatment activated with K2CO3 and adding 10 % of carbon black.

CB_AT_HT_K2CO3_1:4	
Current density (A/g)	Specific capacity (mAh /g)
0.1	141.52
10	65.27 @2000 cycles
20	55.55



Conclusions

- > K₂CO₃ was identified as a superior chemical activating agent for the AT biomass than the commonly used KOH. BHC-derived electrodes could demonstrate their promise for scalable and sustainable energy storage solutions for ZHSCs.
- > In ZHSCs, the use of ZTFS electrolyte enhances the stability of the electrochemical system compared to the more widely used ZnSO4 electrolyte. Also, carbon black addition elevates the specific capacity at higher current densities.

References

- [1] WANG, Y., et al. Nano-Micro Letters. 1 December **2023**.
- [2] SHAH, S.S., et al. Batteries. **2024**. Vol. 10, no. 5

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