



WC-based materials for electrocatalytic hydrogen evolution

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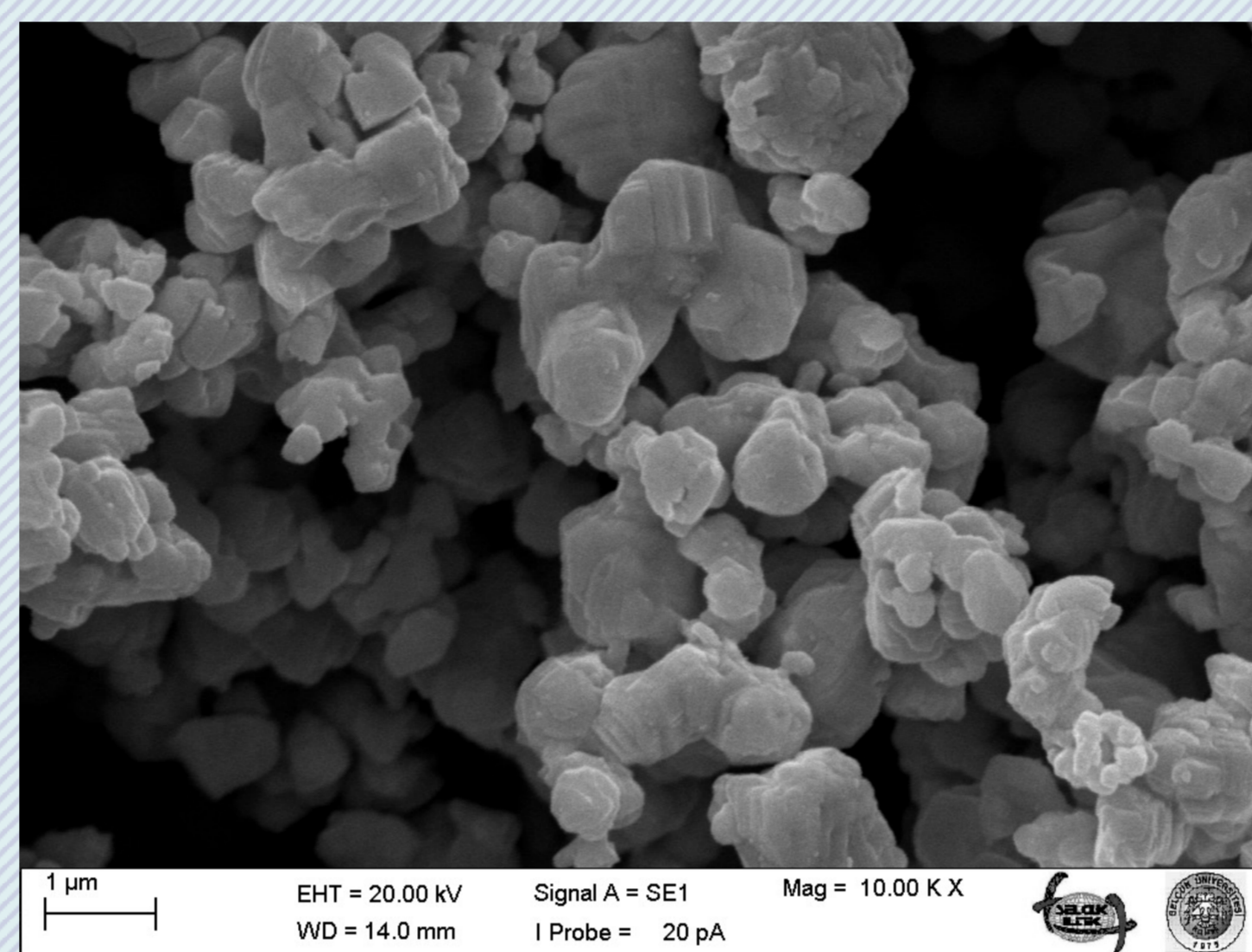
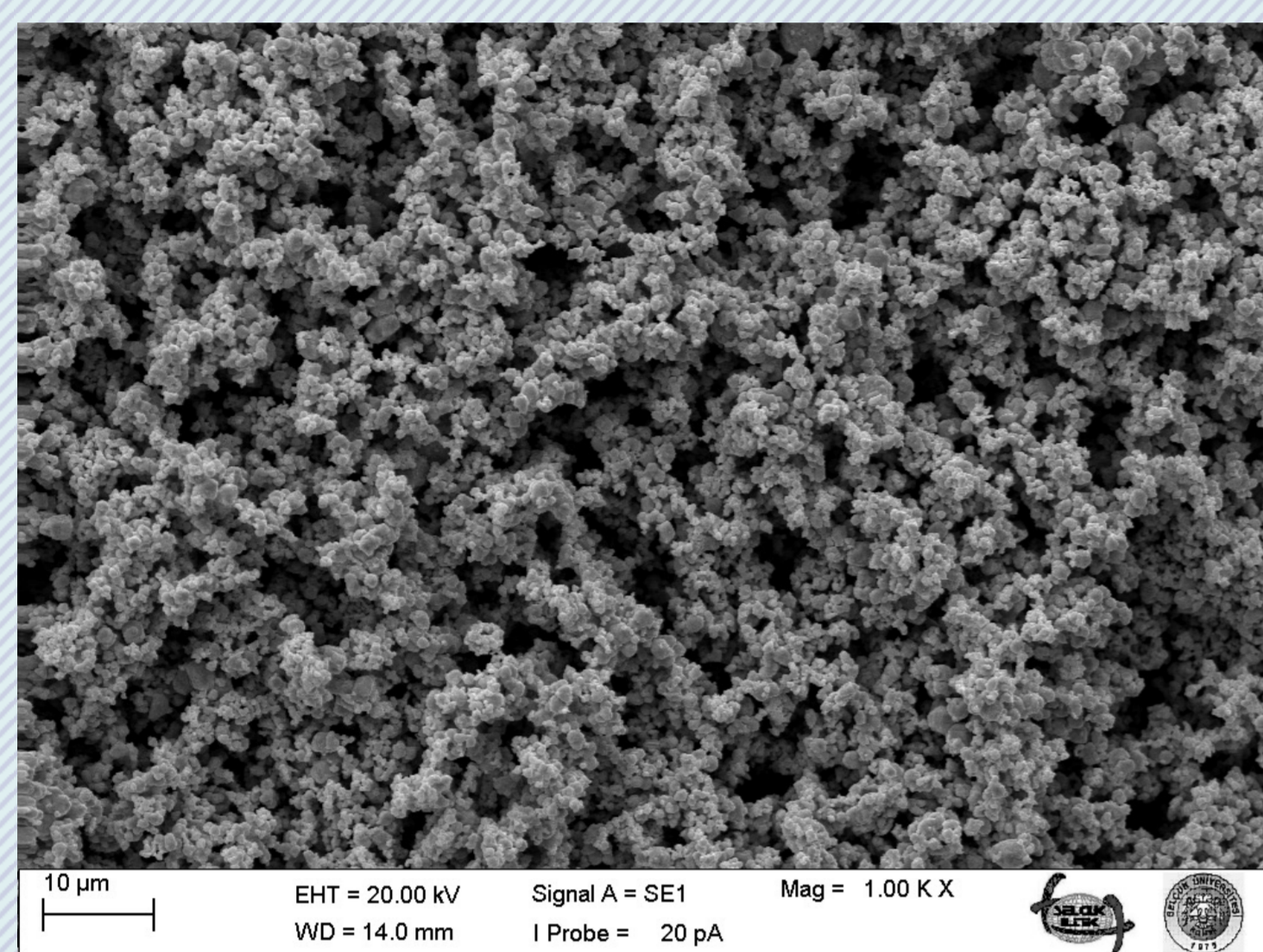
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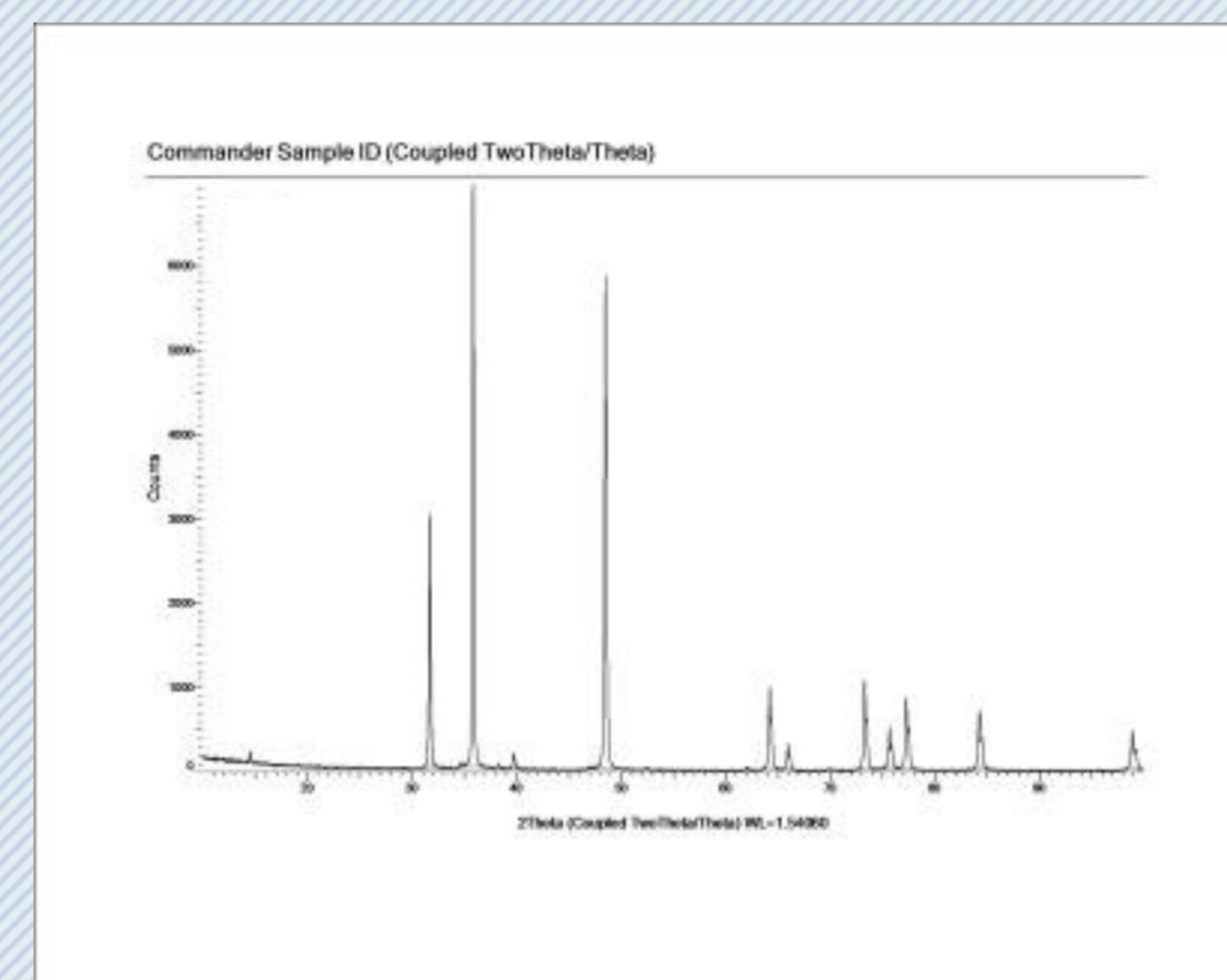


WC, WC/Co, WC/Ni and WC/CoNi catalysts will be used for the electrocatalytic hydrogen evolution at solid/liquid interfaces by using standard three electrode system. It is considered that this work opens new perspective for carrying out artificial photosynthesis, which are similar to enzyme structures in the water splitting (WS) reaction. In this study, the hydrogen evolution reaction (HER) efficiencies of solvothermal synthesized WC/Co, WC/Ni and WC/CoNi catalysts are expected more efficient than only WC due to the synergetic effect between WC and Co, Ni and CoNi.

Morphological and Structural Characterizations of WC Microparticles

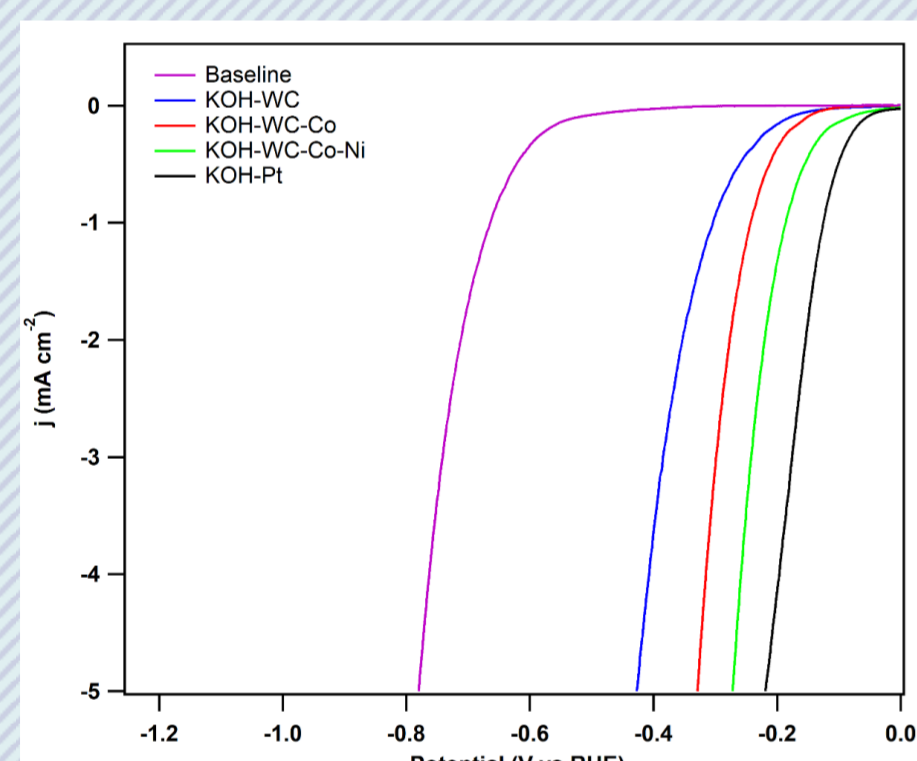


SEM images of WC microparticles with different magnifications

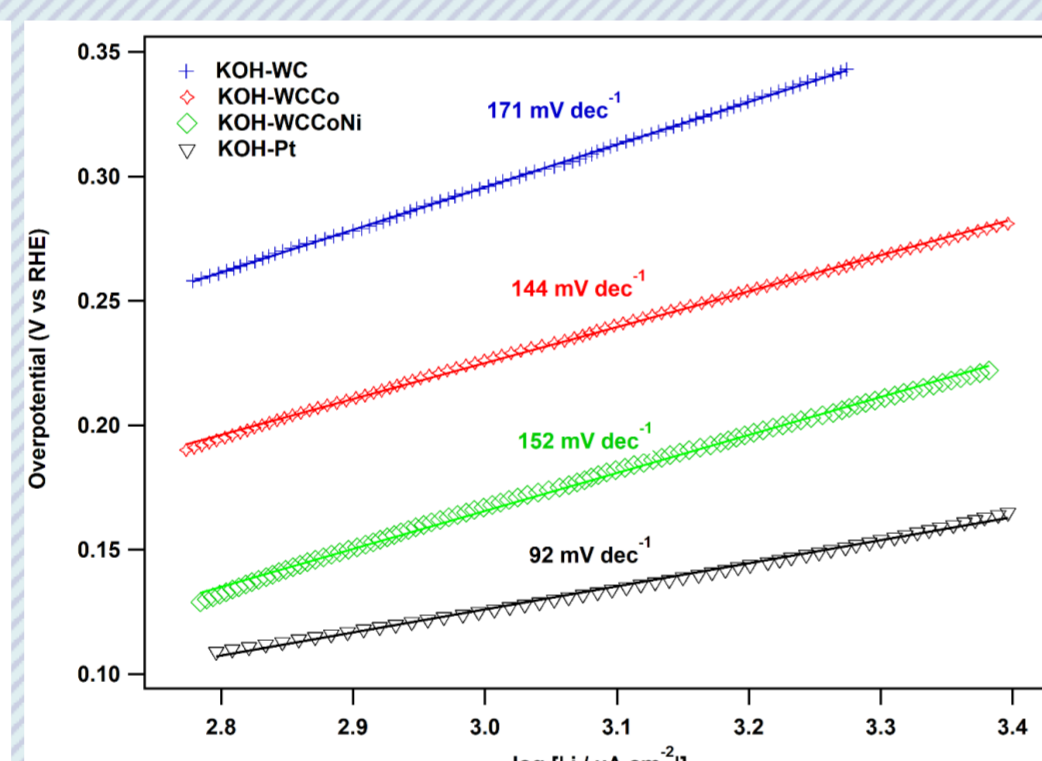


XRD spectra of WC microparticles

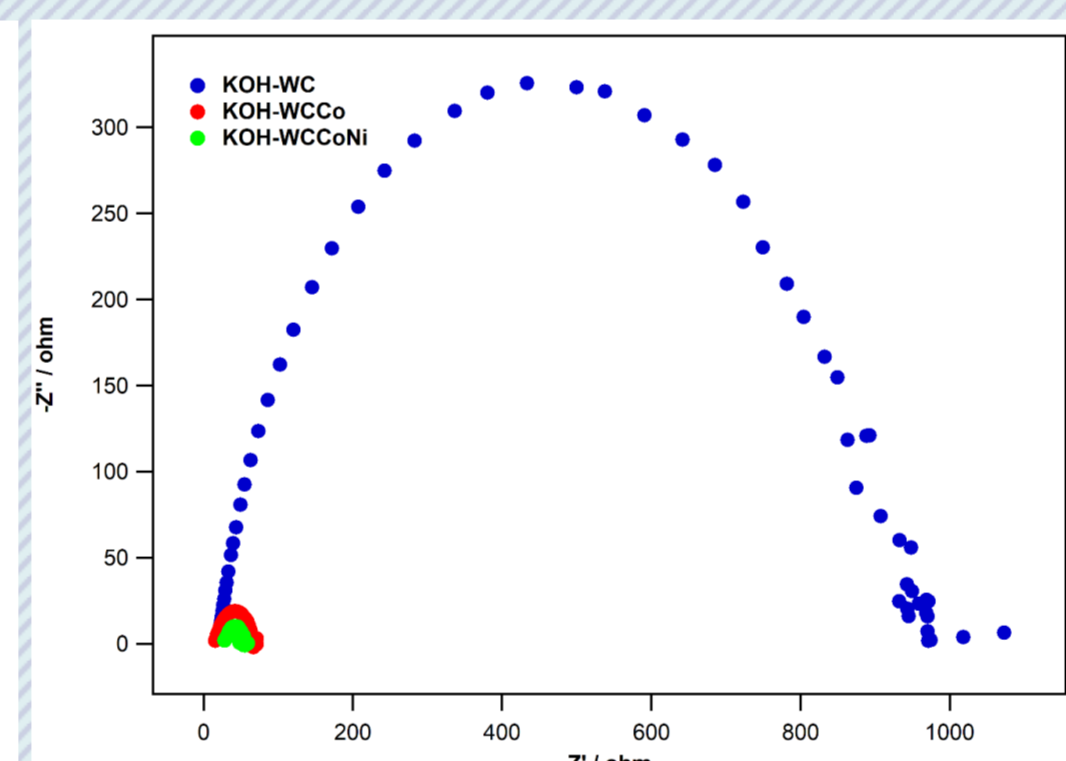
Electrocatalytic HER at alkaline conditions



LSV of WC-based electrocatalysts

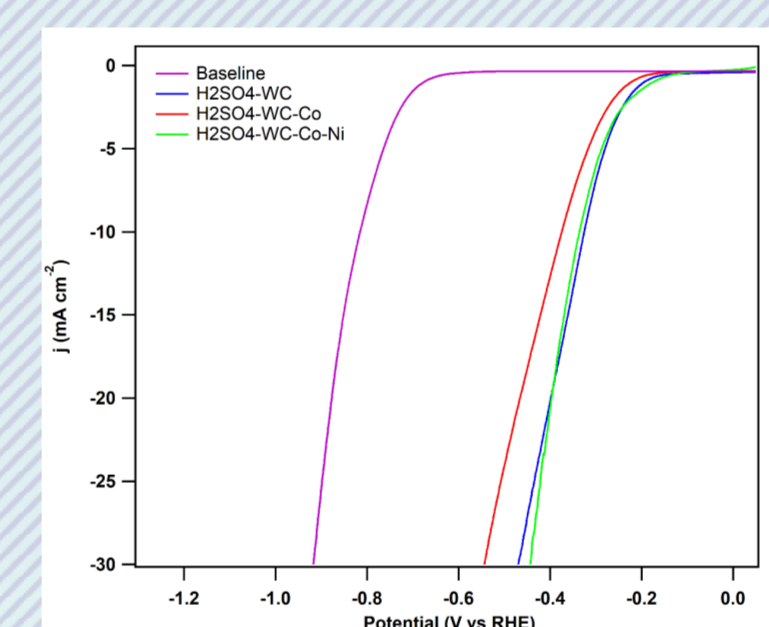


Tafel plots of WC-based electrocatalysts

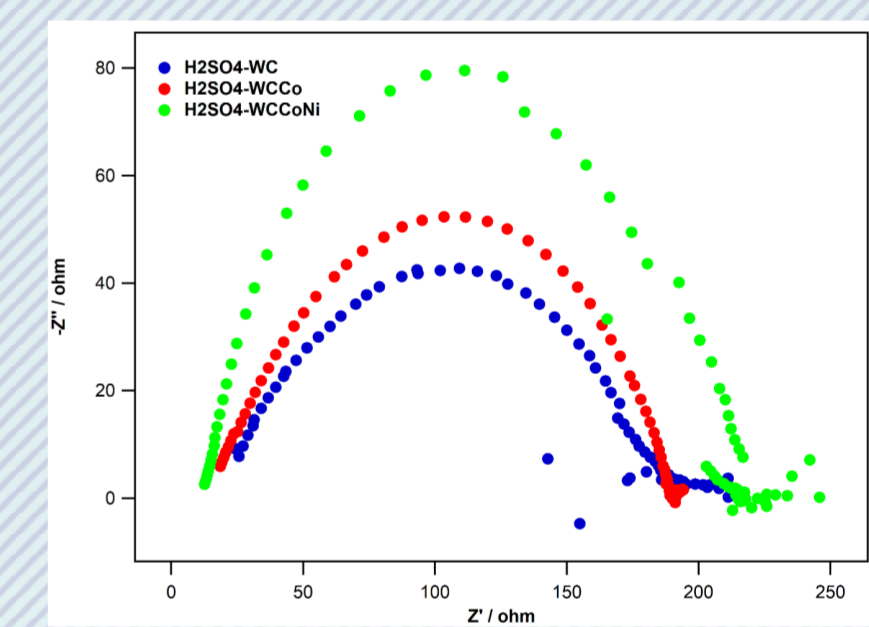


EIS of WC-based electrocatalysts

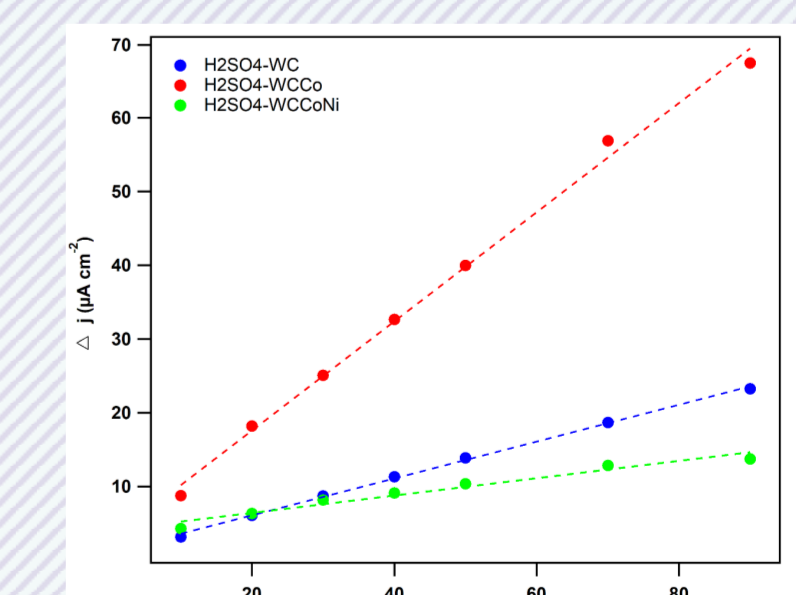
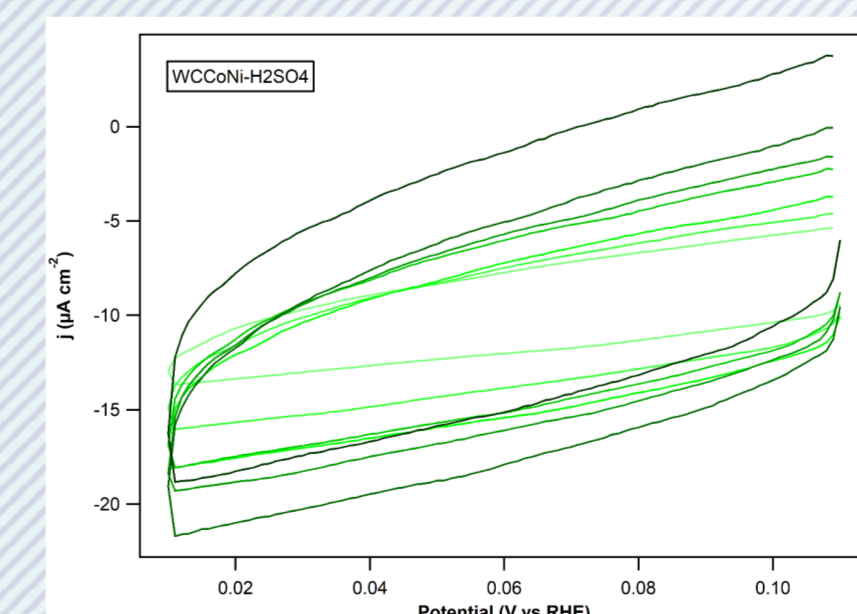
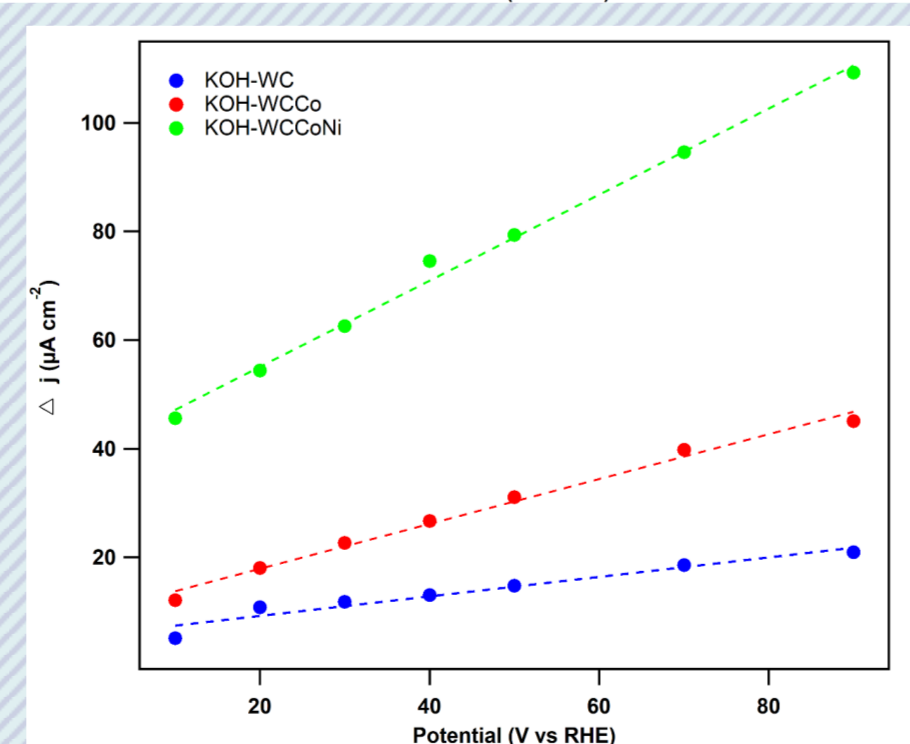
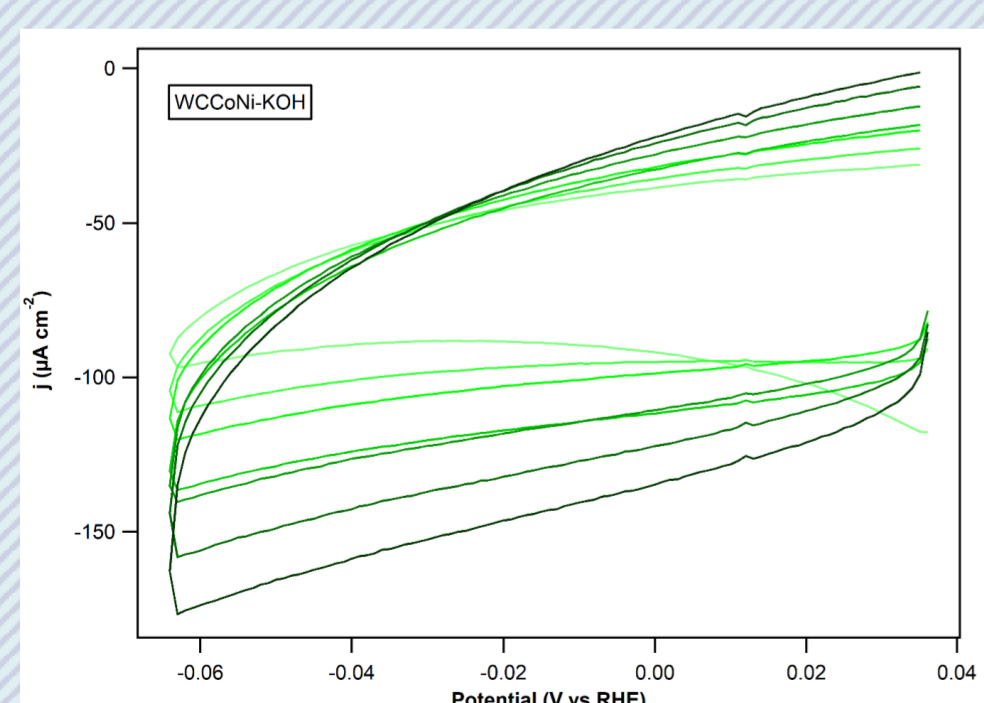
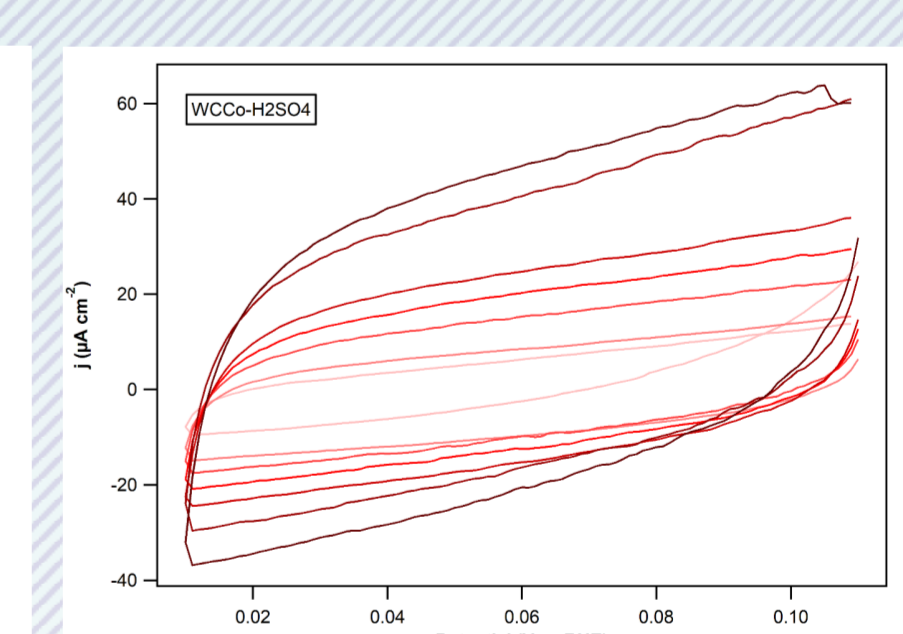
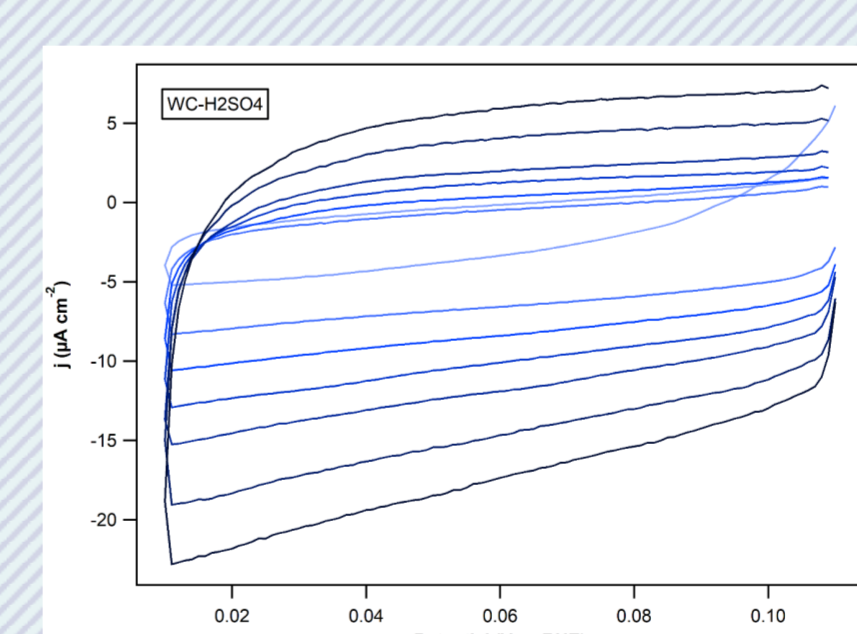
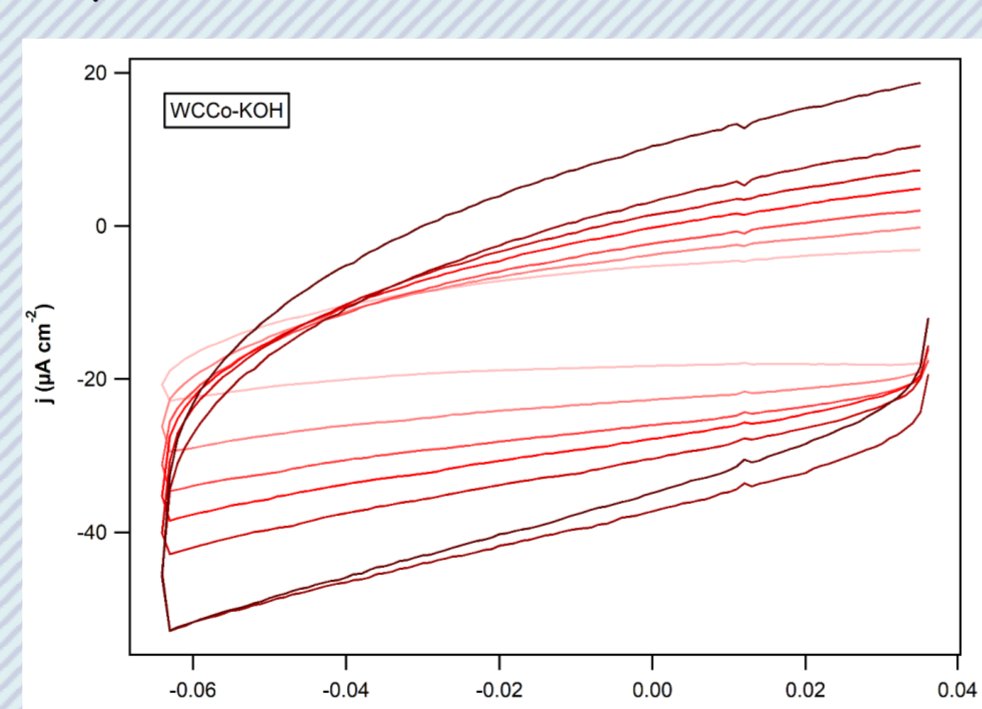
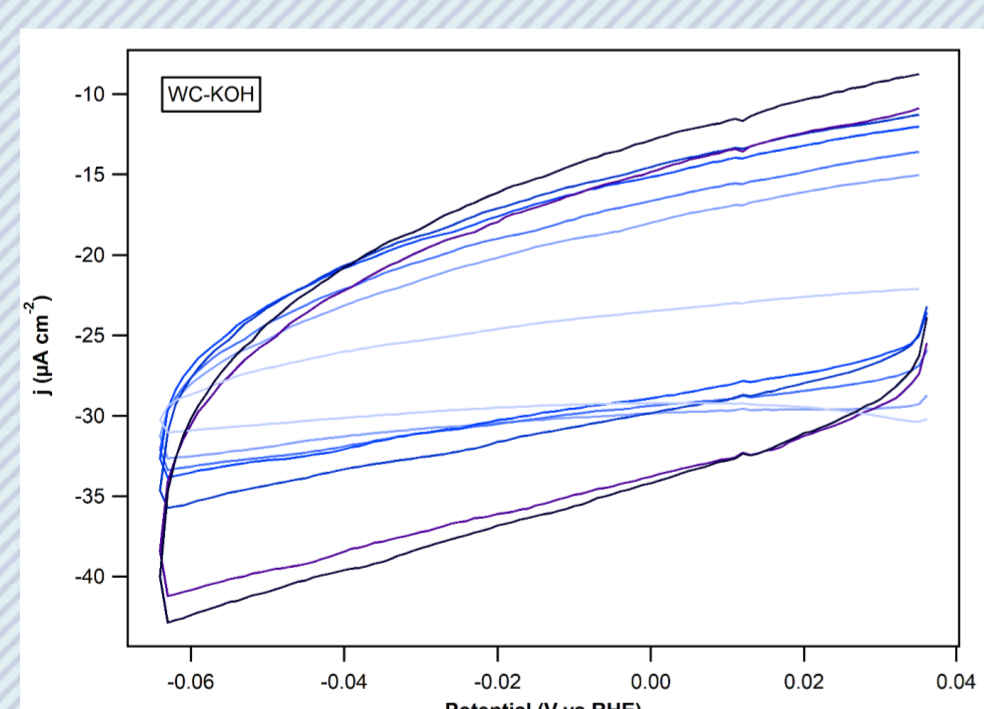
Electrocatalytic HER at acidic conditions



LSV of WC-based electrocatalysts



EIS of WC-based electrocatalysts



CV of WC-based electrocatalysts changing scan rates (10-90 mV s⁻¹) and their capacitance calculations

CV of WC-based electrocatalysts changing scan rates (10-90 mV s⁻¹) and their capacitance calculations

Conclusions

WC based materials used as electrocatalysts for electrocatalytic hydrogen evolution in the acidic and alkaline media. They are displayed catalytic activities when compared to bare electrode. In addition, Co and Ni doped WC displayed more catalytic activities. The doped materials display more catalytic activities in the alkaline media, which are proofed by linear sweep voltammetry, cyclic voltammetry and electronic impedance spectroscopy techniques. This study paves the way the novel application for different catalytic application.

Acknowledgements

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