

Nano Zero-Valent Iron Immobilized onto Biochar: An Effective Solution for Mitigating Microplastic Contamination in Aquatic Ecosystems

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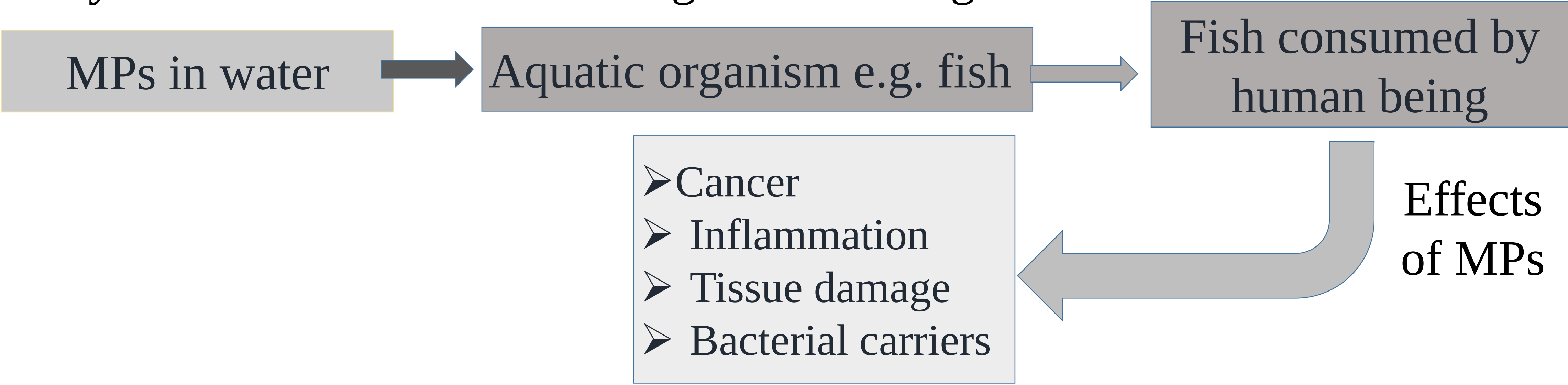
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Introduction

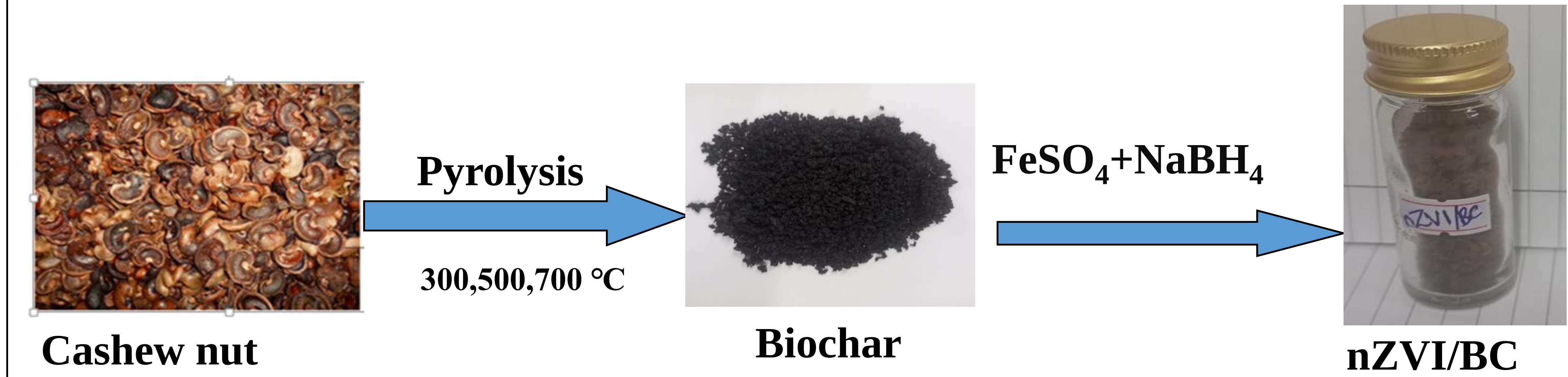
❖The extensive presence of microplastic pollution in the aquatic environment has recently been identified as a critical global challenge.



❖This project focuses on synthesizing and testing the performance efficiency of nano-zero valent iron immobilized with biochar for mitigation of aquatic microplastic pollution from the aquatic environment

Methodology

Cashewnut shells were collected from the Amama cashew nut industry in Mtwara.



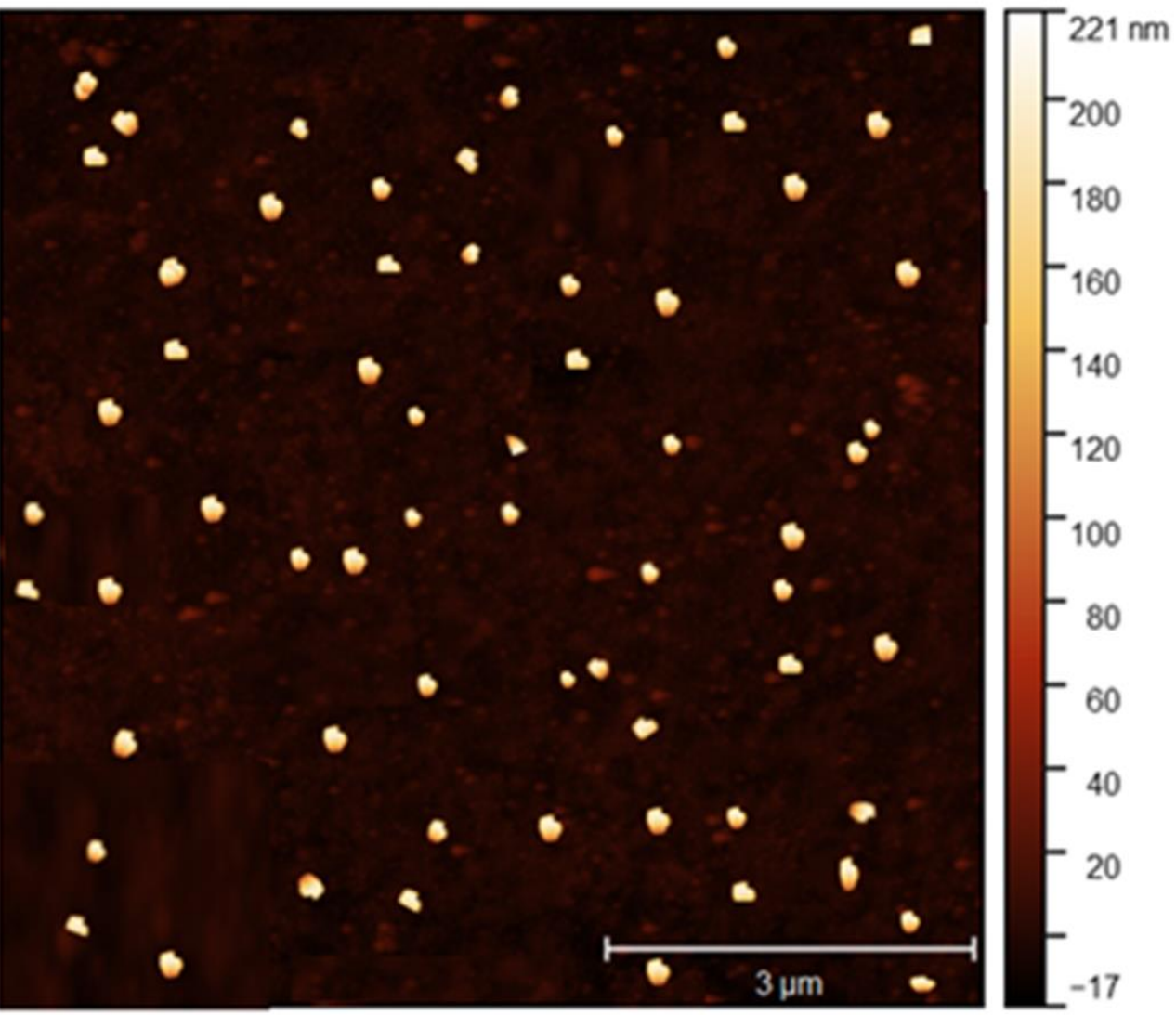
Cashew nut shells

Biochar

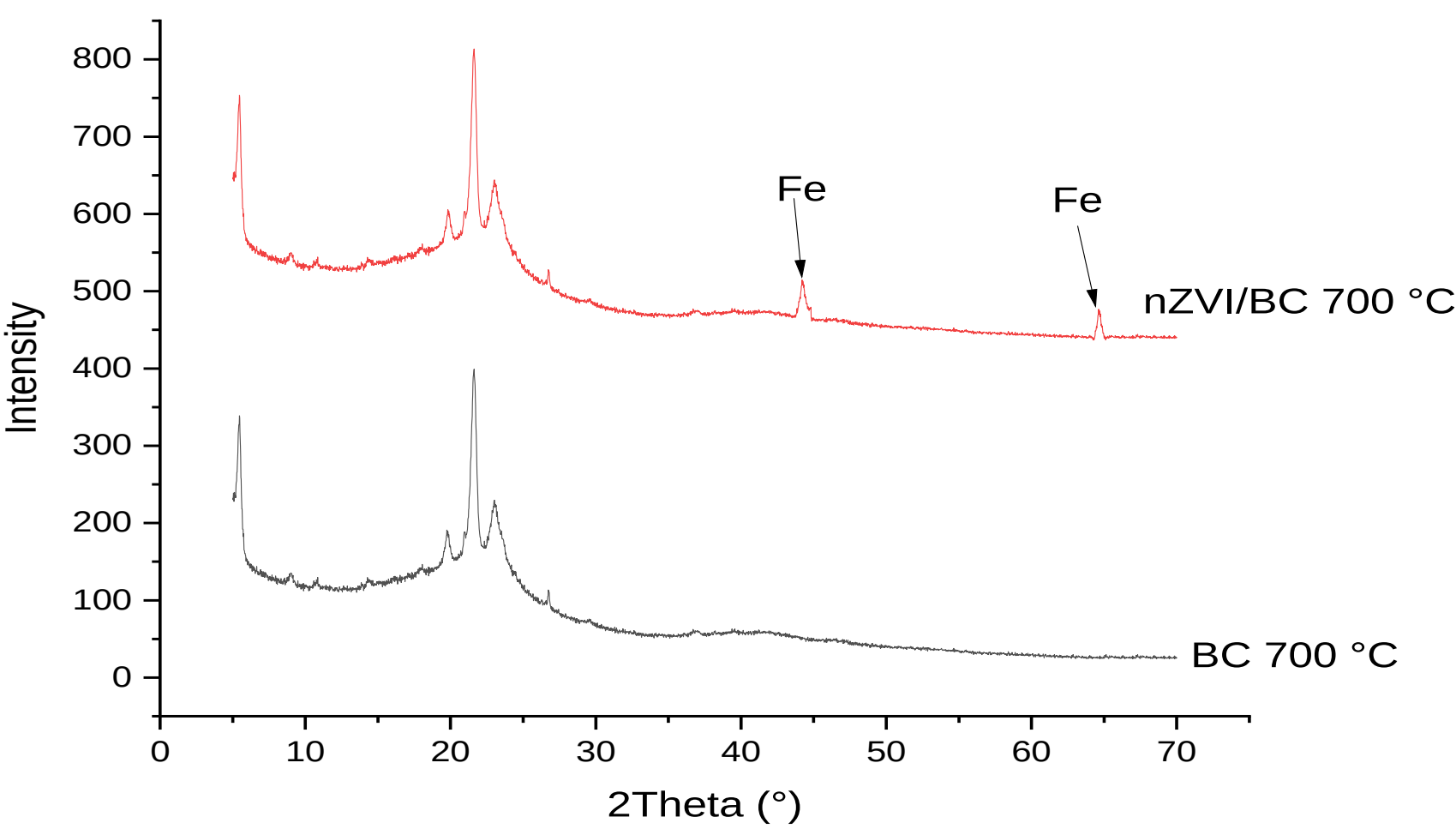
nZVI/BC

Characterization XRD, BET, UV-Vis, AFM and FT-IR analyses

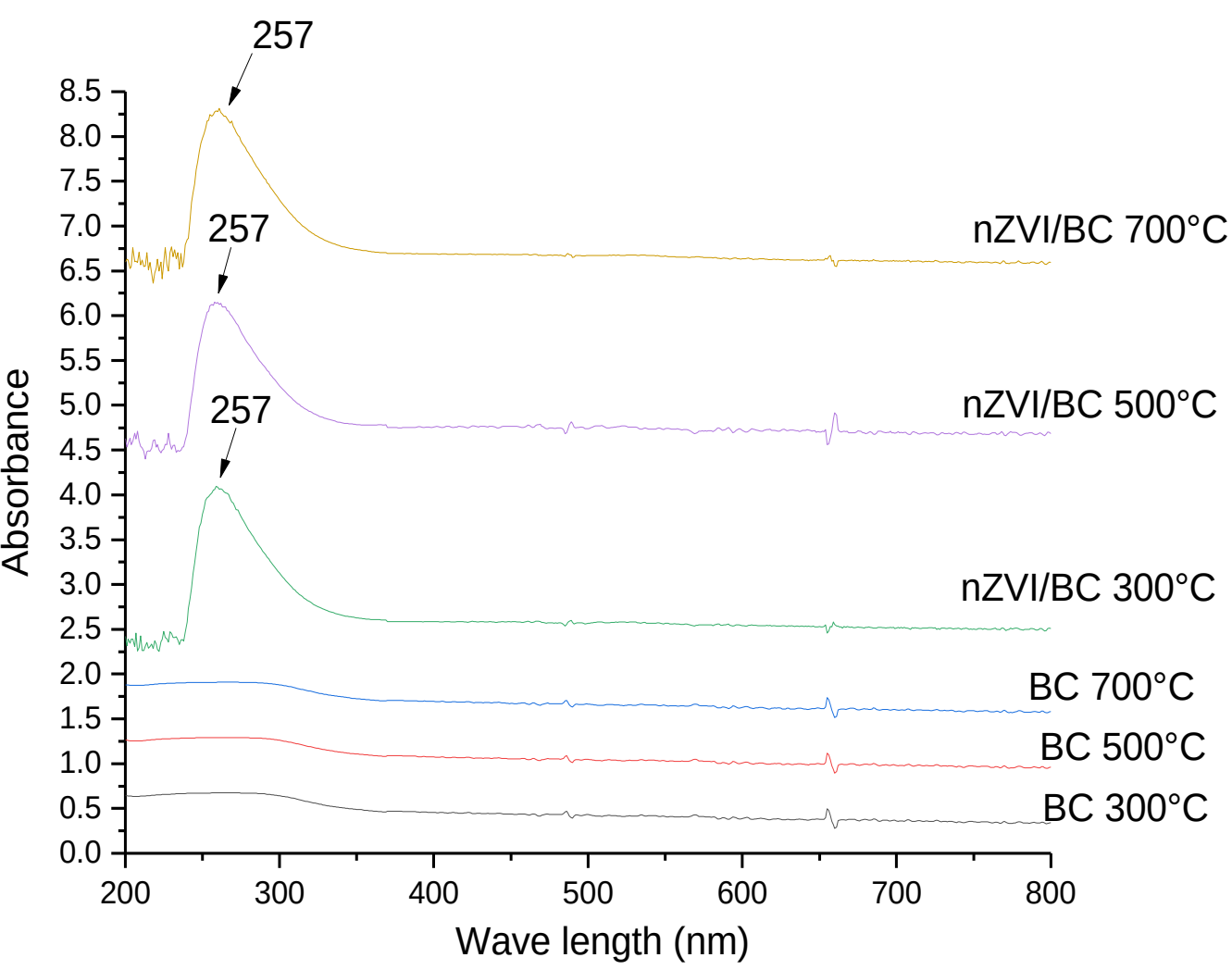
Results



A



B



C

Discussion

- ❖ AFM image (A), XRD diffractograms (B) and UV-Vis Spectrum (C) confirmed successful immobilization of biochar with nZVI.
- ❖ Immobilized biochars had higher BET surface area 707.765 m²/g. This indicated that all composites have high adsorption capacity. However, composites with biochar prepared at 700 °C had highest BET surface area.

Conclusion

- ❖ Adsorption capacity of nZVI/BC synthesized with biochar prepared at 700 °C had superior adsorption capacities for MPs.
- ❖ Generally, the success of this study anticipated to respond Sustainable Development Goals SDGs 6, 11, 13, and 14.

Recommendations

- ❖ Further studies should be done on production of biochar using other bio-waste materials.
- ❖ Education should be done to the public on the effects of microplastics.