

Introduction

Paper and pulp wastewater

- High COD
- Colour
- Lignin
- Salts
- TSS

Treatment

Pre-treatment>biological>UF membranes>RO membranes

TFC membranes

- High rejection
- Low comparable pressure requirement compared to RO
- High flux

Objectives

- Synthesis and characterise Fe-BTCA MOF/Fe-BTCA@GO composite
- Fabricate pristine UF membranes
- Fabricate PES/TFC membranes via interfacial polymerization
- Test fabricated membranes using model foulants
- Test fabricated membranes in the treatment of paper and wastewater and perform postmortem analysis

PES/TFC membranes characterization

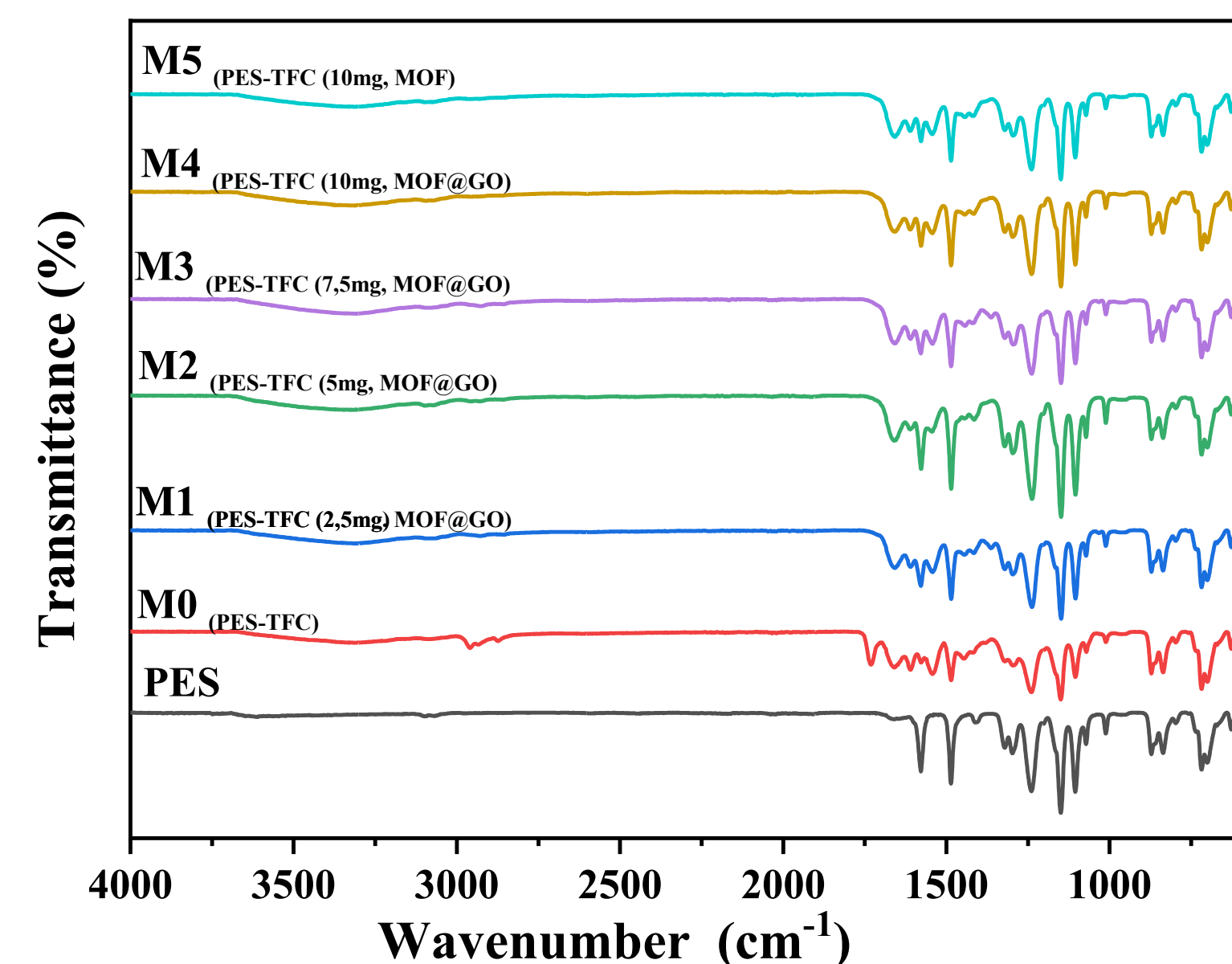


Fig. 2. FTIR spectra of fabricated pristine PES and PES-TFC membranes incorporating nanofillers

Interfacial polymerisation

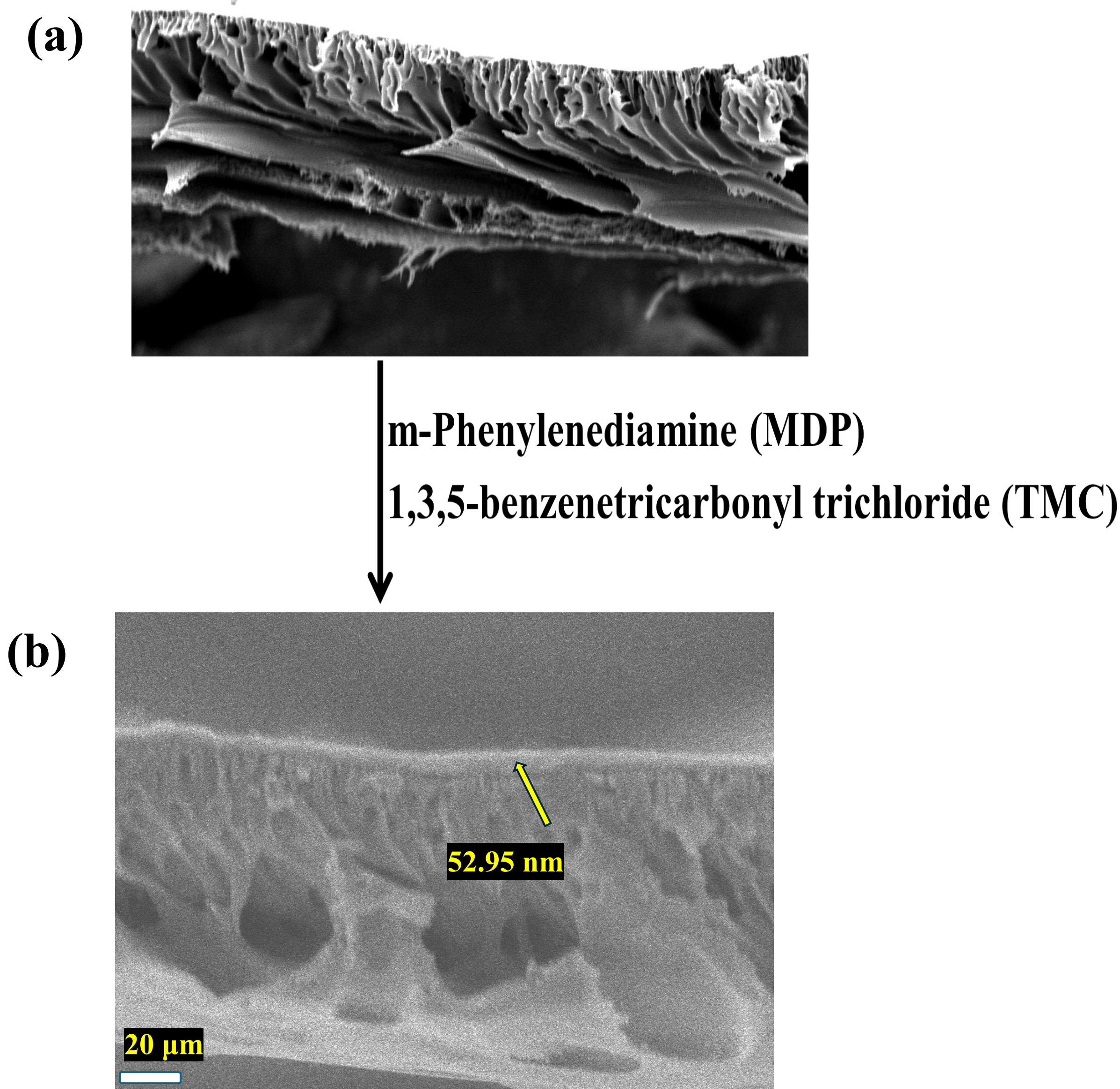


Fig.1. SEM depicting (a) pristine UF membrane, and (b) UF-TFC membranes obtained by Interfacial polymerization process

Results

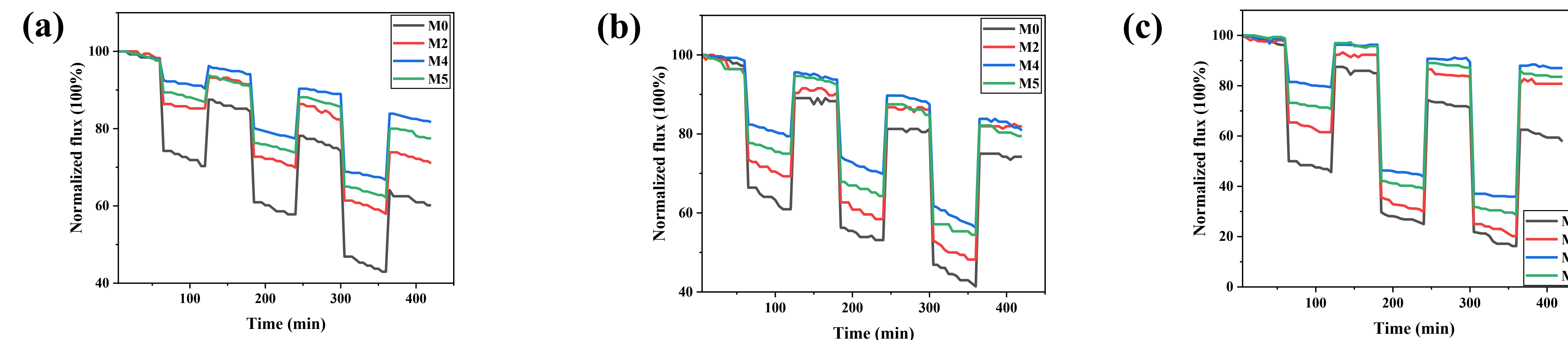


Fig.3. Resuability potential of (a) HA, (b) BSA, and (c) paper and pulp wastewater

Used membranes analysis

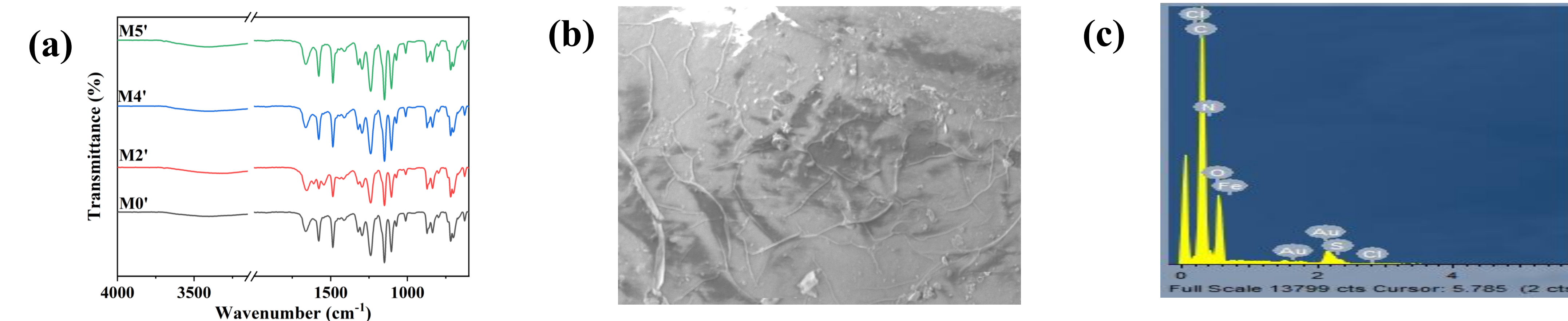


Fig.4. Used (a) FTIR, (b) SEM of M4 and (c) EDS of M4 after PPW filtration

Conclusion

PES-TFC_(10mg, MOF@GO) exhibited superior antifouling performance with flux recovery ratio (*FRR*) of 91, 85 and 85% for HA, BSA and PPW respectively. Further, the postmortem analysis SEM images exhibited thin organic deposited layer and FTIR suggested possible hydrogen bonding between foulants and amide group.

Acknowledgements

References

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