Electronic Supplementary Material (ESI) for Environmental Science: Water Research & Technology.

Functionalized hexagonal boron nitride sheets and charge triggered interpenetrating polymer network based membranes work in tandem towards water remediation

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Supplementary Information

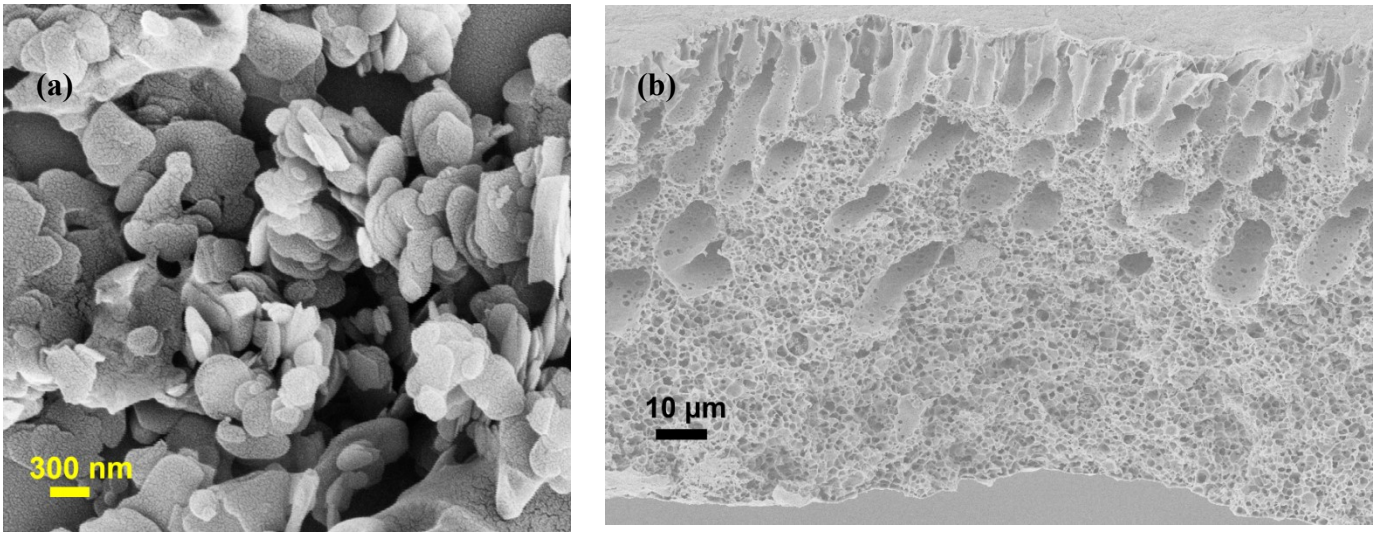


Fig. 1. SEM micrograph of (a) hBN and (b) cross section of neat IPN membrane- the sponge and finger like morphology characteristic of membranes prepared from the non-solvent induced phase separation technique can be clearly seen.

Fig. S2. In-house assembled crossflow filtration setup- used for pure water flux measurements and BSA fouling studies.

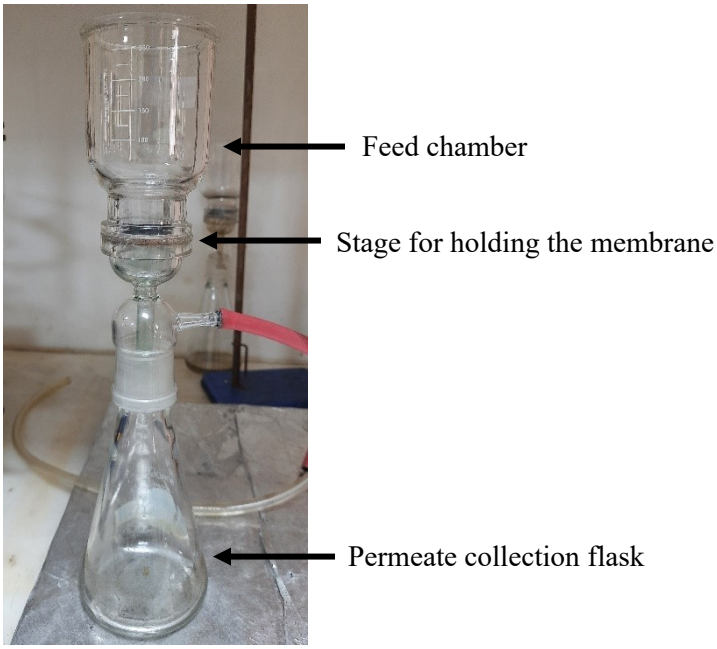
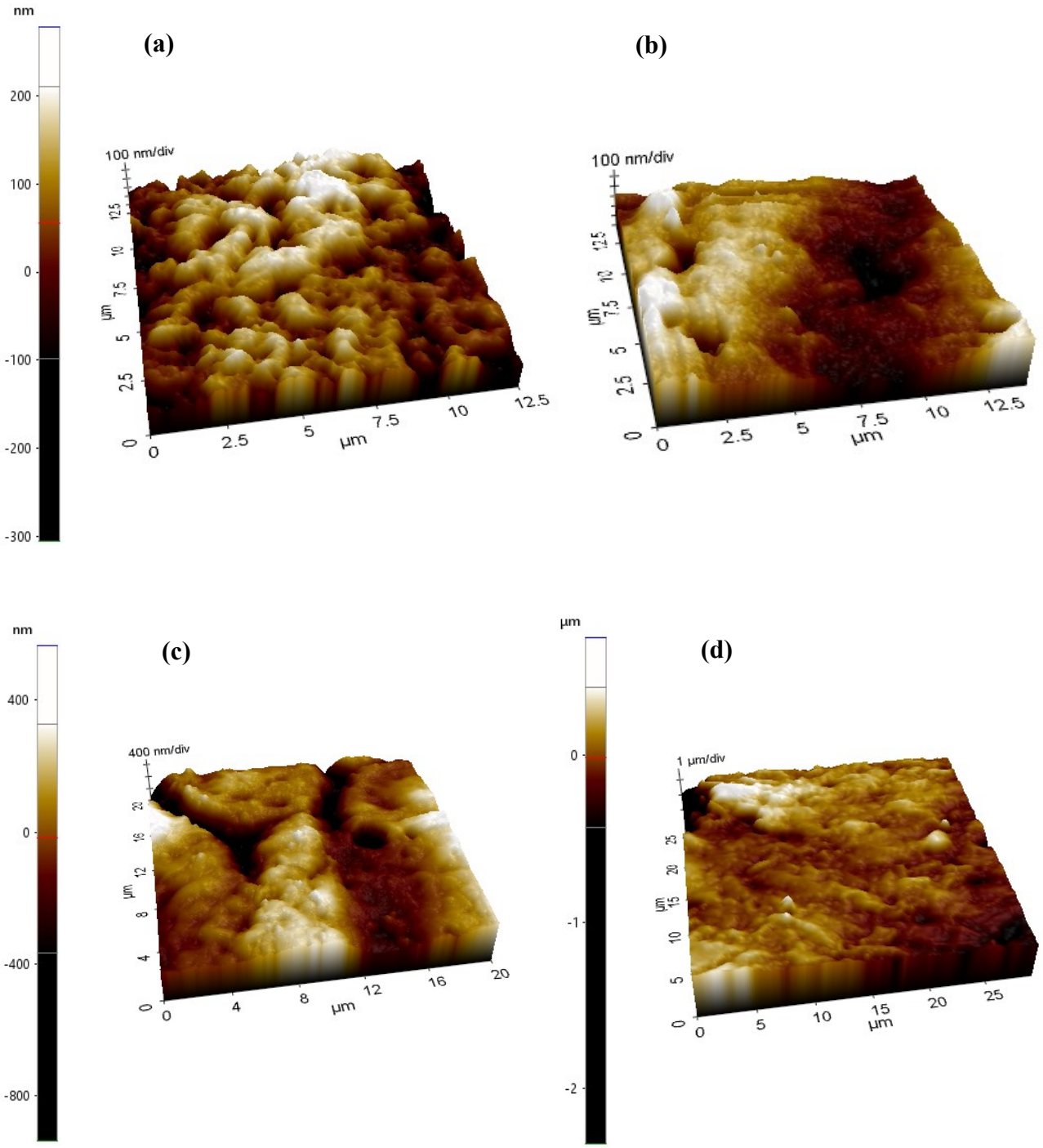


Fig. S3. Vacuum filtration setup used for dye rejection studies at atmospheric pressure.



17 **Fig. S4.** AFM micrographs of the membranes. (a) Front and (b) back side of fhBN/PVDF
18 membrane. (c) Front and (b) back side of fhBN-IPN membrane.

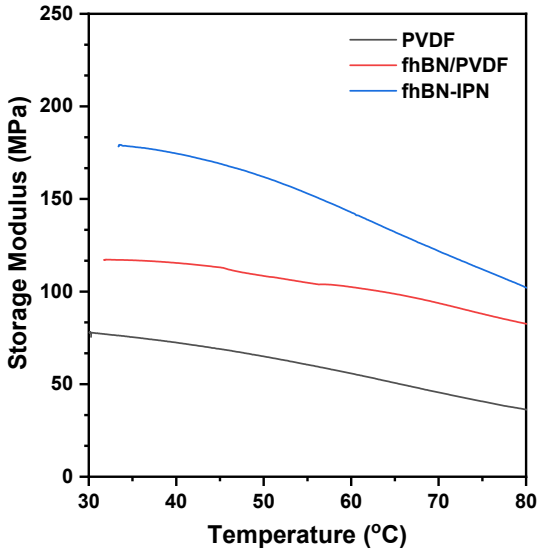


Fig. S5. DMA analysis of the neat PVDF, fhBN/PVDF, and the fhBN-IPN membranes.

The increase in storage modulus for the fhBN/PVDF membrane (117 MPa) compared to that of the neat PVDF membrane (76 MPa) at room temperature is due to the mechanical reinforcement offered by hBN. A further enhancement in storage modulus is observed in the presence of the polydopamine network in fhBN-IPN membrane (179 MPa).

Table S1. Root mean square roughness of either side of the membranes.

Membrane	**Roughness in nm (Front)**	**Roughness in nm (Back)**
fhBN/PVDF	96.3	84.4
fhBN-IPN	178.3	214.8

Although the roughness of the fhBN-IPN membrane is higher than that of fhBN/PVDF membranes, the former showed high fouling resistance. This could imply that its fouling resistance was dominated by membrane hydrophilicity and the negative surface charge on activation with NaOH [1].

References

1 G. Pérez-Mitta, J. S. Tuninetti, W. Knoll, C. Trautmann, M. E. Toimil-Molares and O. Azzaroni, *J. Am. Chem. Soc.*, 2015, **137**, 6011–6017.