

## Partially oxidised boron nitride as a 2D nanomaterial for nanofiltration applications

Natalia García Doménech, Áine Coogan, Finn Purcell-Milton, María Luisa Casasín, Adrián Sanz Arjona, Marc Brunet Cabré, Aran Rafferty, Kim McKelvey, Peter Dunne and Yurii K. Gun'ko

Table S1: Concentration and absorbance on the maximum of absorbance of the dyes.

Dye	Concentration ( $\mu\text{M}$ )	Max. Abs (nm)	Absorbance (a.u)
Evans Blue	15	600	1
Methylene Blue	27	663	1.5
Methyl Orange	50	445	1.2

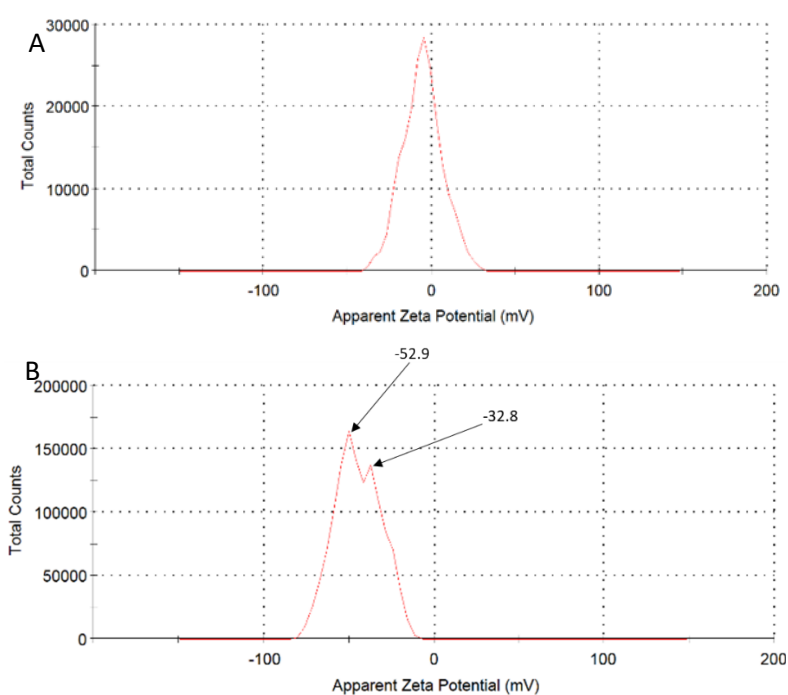


Fig. S1: Zeta potential measurements of A) BN and B) BNOx.

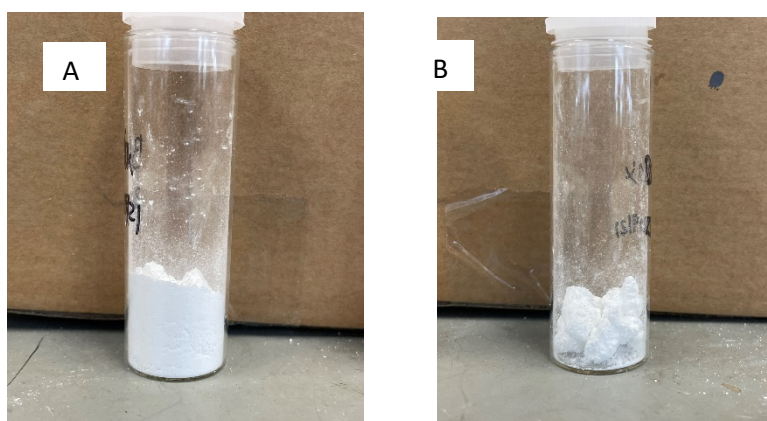


Fig. S2: BNOx out of the furnace as A) powder and B) “rocks”.

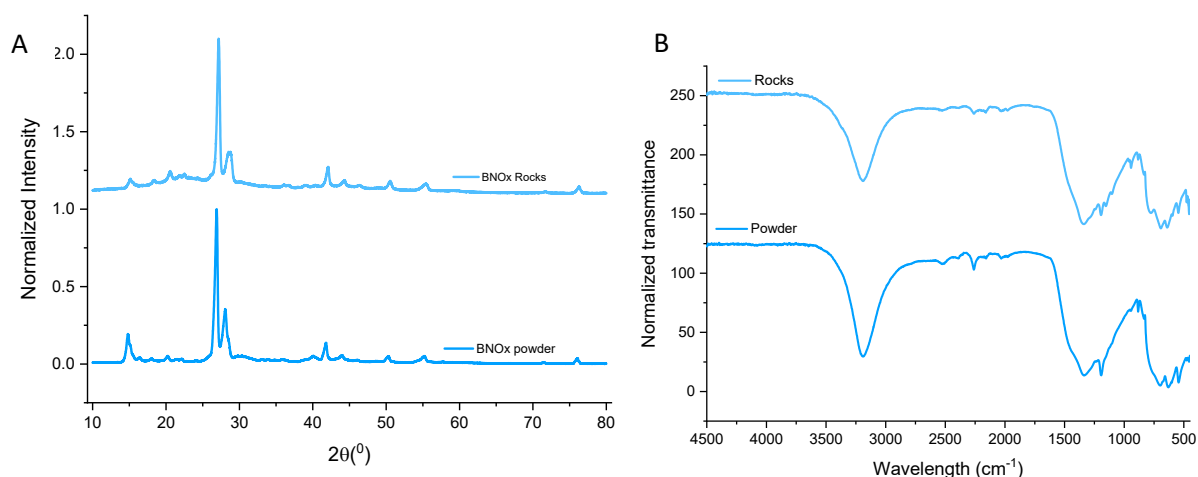


Fig. S3: A) PXRD patterns of BNOx powder and BNOx rocks and B) FTIR of BNOx powder and BNOx rocks.

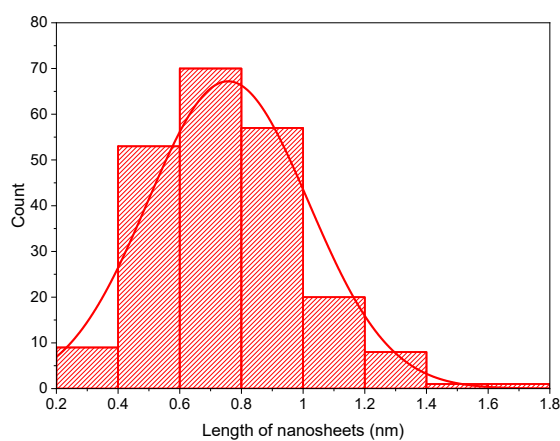


Fig. S4: size distribution of BNOx nanosheets after exfoliation.

Table S2: Main features of bulk BN and BNOx and exfoliated BNOx in Raman spectra.

Sample	Peak shifht ( $\text{cm}^{-1}$ )	Intensity (a.u)	FWHM ( $\text{cm}^{-1}$ )
Bulk BN	1367	32077	9.32
Bulk BNOx	1367	40160	11.72
Exfoliated BNOx	1367	13710	15.3

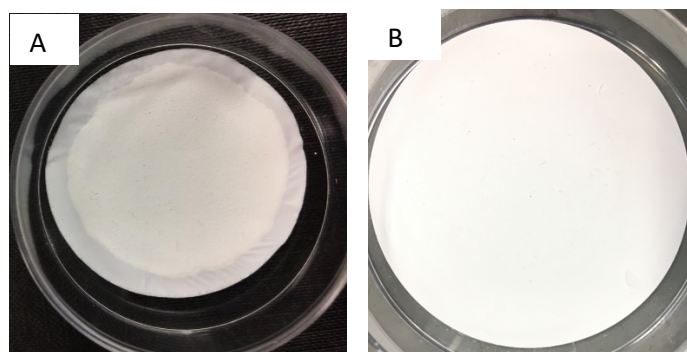


Fig. S5: Photos of A) BN and B) BNOx membranes.

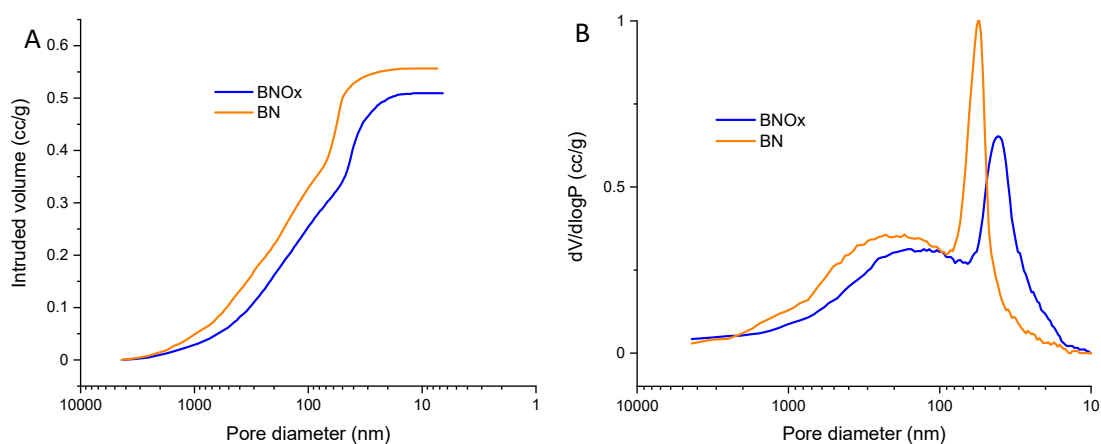


Fig. S6 A) Comparison of mercury intrusion characteristics of the BN and BNOx membrane samples and B) comparison of mercury pore size distribution of the BN and BNOx samples.

Table S3: Summary of BET surface area analysis data.

Sample	Surface area ( $\text{m}^2/\text{g}$ )	BJH desorption pore diameter (nm)	BJH desorption pore volume ( $\text{cm}^3/\text{g}$ )
BN	26.7	3.5	0.089
BNOx	27.3	22.6	0.141



Fig. S7: BNOx membrane after Evans Blue filtration.

Table S4: Summary of data for the retention of Evans Blue of the membranes obtained with BNOx. The values were calculated using Origin 2018.

	N total	Mean	Standard Deviation	Minimum	Median	Maximum
Evans Blue	18	99	1	97	99	100

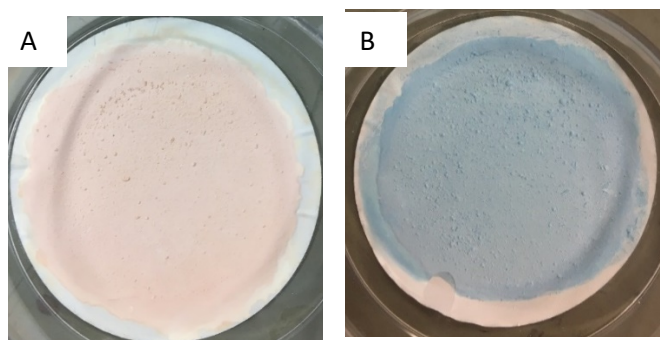


Fig. S8: BNOx membrane after A) Methyl Orange filtration and B) BNOx membrane after Methylene Blue filtration.

Table S5: Statistics from the retention of Methyl Orange and the Methylene Blue of the membranes obtained with BNOx. The values were calculated using Origin 2018.

	N total	Mean	Standard Deviation	Minimum	Median	Maximum
Methyl Orange	10	99	0.3	99	100	100
Methylene Blue	10	100	0.2	99	100	100