Supporting information

Development of novel h-BNNS/PVA porous membranes via Pickering emulsion templating

Danae Gonzalez Ortiz[a], Céline Pochat-Bohatier[a], Sana Gassara[a], Julien Cambedouzou[b], Mikhael Bechelany*[a], Philippe Miele*[a,c]

[a]*Institut Européen des Membranes, IEM UMR-5635, ENSCM, CNRS, Université de Montpellier, Place Eugene Bataillon, 34095, Montpellier, France.*

[b]*ICSM, CEA, CNRS ENSCM, Univ. Montpellier, Marcoule, France.*

[c]*Institut Universitaire de France (IUF), MESRI, 1 rue Descartes, 75231 Paris cedex 05, France.*

S1. Strategy of formation of porosity in membranes

In this strategy, a water solution containing the polymer and the nanoparticles is homogenously dispersed. When the oil phase is added, the polymer (insoluble in oil phase) remains in the water phase. In this case, the nanoparticles display a hydrophobic character, thus they will tend to form a 'shell' around the oil droplets. At this point, we consider that an oil-in-water emulsion stabilized by h-BNNS has been formed containing the polymer (PVA) in the continuous phase.

Then, the as-obtained emulsion is spread onto a compatible support, glass support in our case, using casting technique. The obtained membrane is composed, as the emulsion, by a continuous phase containing the polymer; and the dispersed phase in form of droplet stabilized by the nanosheets. When the membrane is left to cure at room temperature, the evaporation of water and oil could occur. This curing step will define the morphology of the membranes. As longer time, the membranes are left to dry, the evaporation of solvents will be more significant, and consequently the polymer chains will become closer to each other reducing the droplet size an leading to a droplet collapse for longer times.

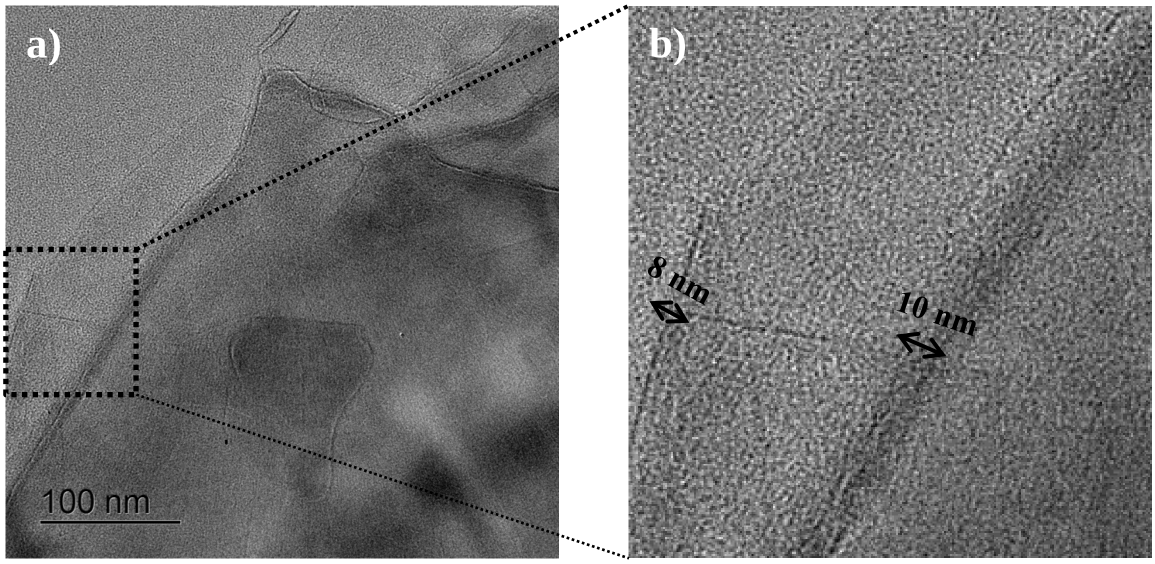

Fig. S1 a) TEM image from exfoliated h-BN and b) Inset of the image

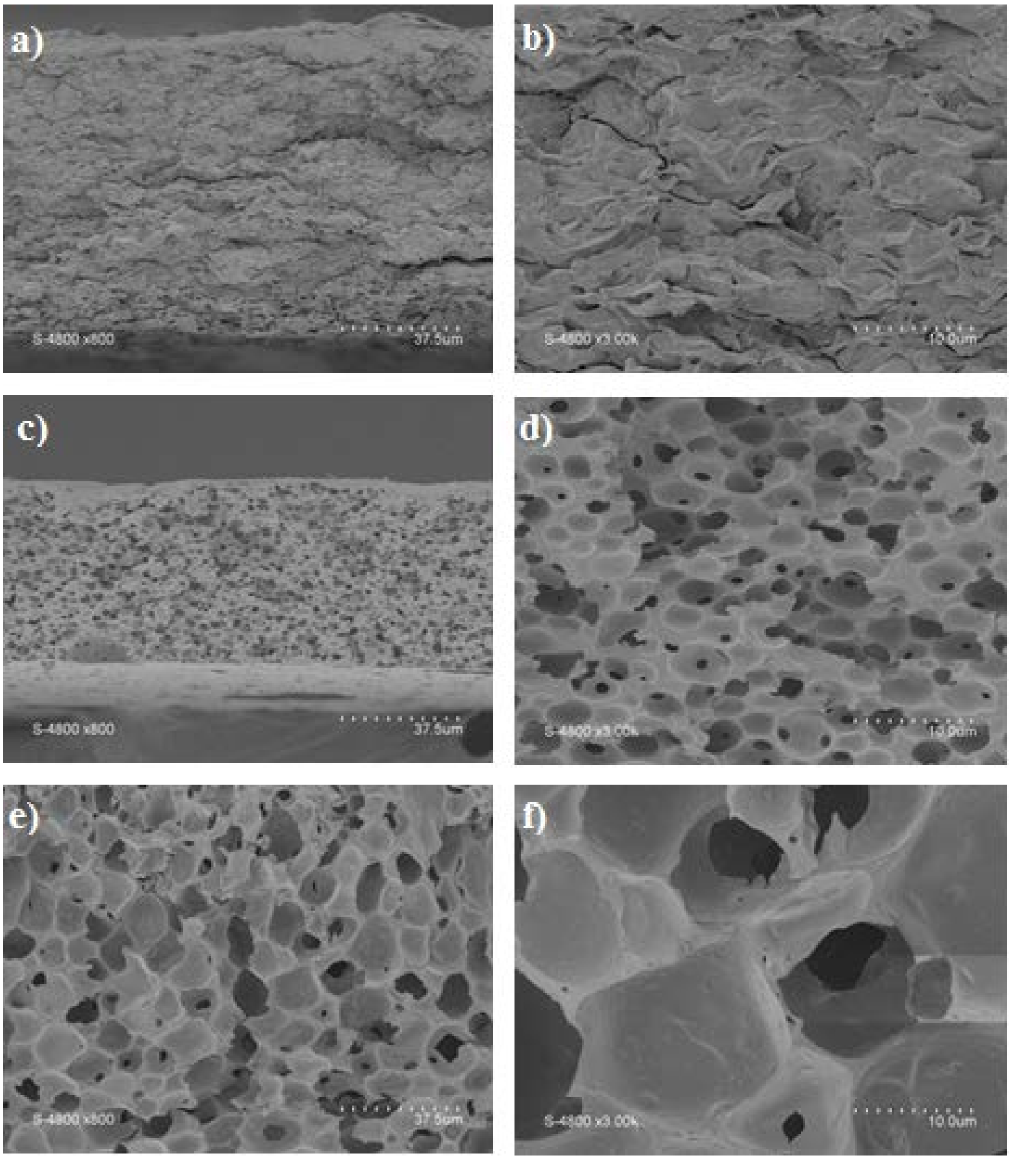

Fig. S2 SEM images of h-BN/PVA porous membranes depending on the curing time before crosslinking at different magnifications: a,b) cross-section of BNP-24h, c,d) cross-section of BNP-3h and e,f) cross-section of BNP-1h

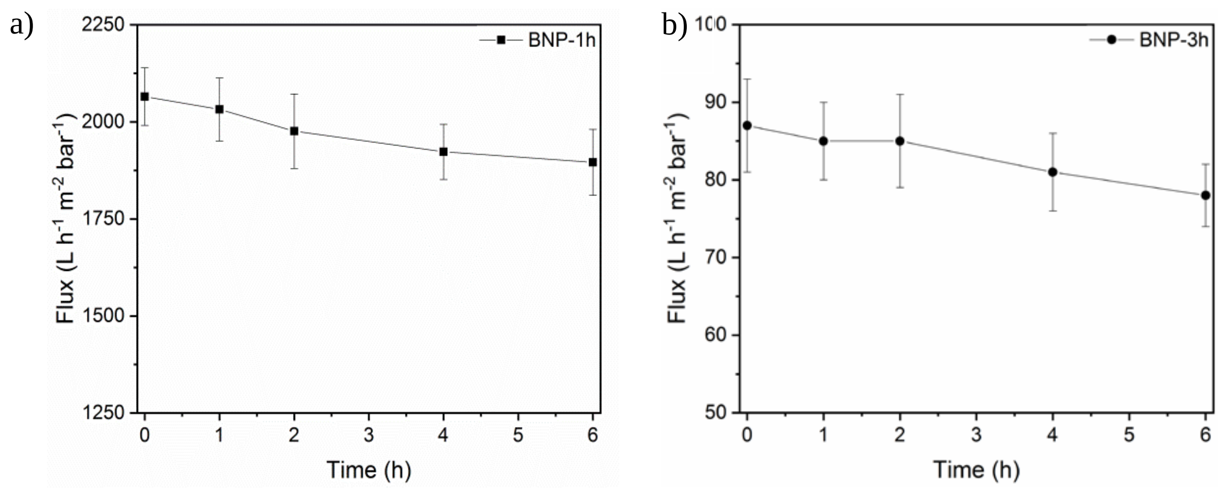

Fig. S3 Water flux performance after 6h experiment of a) BNP-1h and b) BNP-3h membranes