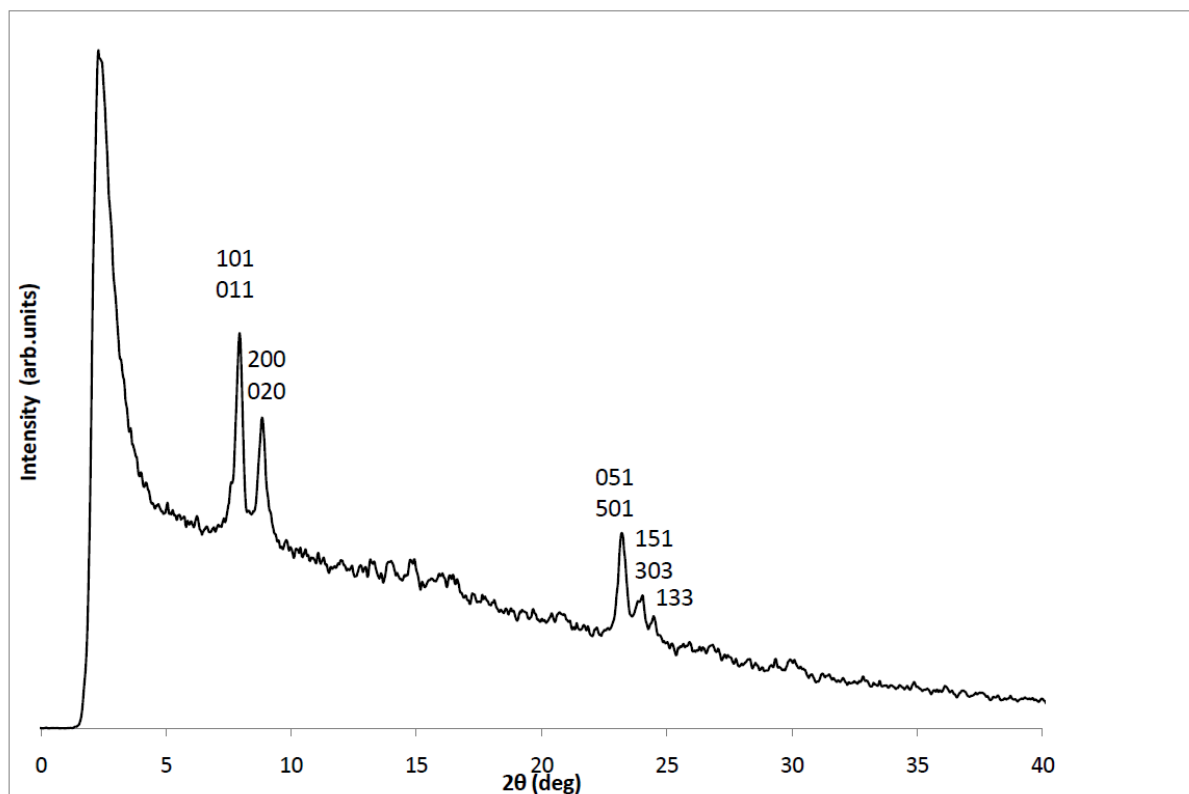


SUPPLEMENTARY INFORMATION

1. XRD pattern of the synthesized hollow spheres with silicalite-1 shell.



2. Synthesis procedure of the crosslinked support membrane

A solution containing 15% Matrimid® (Huntsman, Switzerland) polyimide, 2% water and a 3:1 ratio of N-methylpyrrolidone and tetrahydrofuran was stirred overnight and left to stand until all bubbles disappeared. The solution was spread onto a non-woven polypropylene/polyethylene support (Novatex 2471, Huldenberg, Germany) with an automated casting knife set at 250µm. The resulting film was left to evaporate for 30s and then immersed into a coagulation bath containing water at room temperature. The resulting membranes were immersed into a 10%w/v methanolic para-xylylenediamine bath for 24 hours for crosslinking and were rinsed with methanol to remove all excess crosslinker. The membranes were then immersed into a toluene:4-methyl-2-pentanone bath (50:50) for several days before air-drying.