



SEM image of, a) FAU-membrane surface, b) cross section of FAU membrane, c) LTA membrane surface and d) cross section of LTA membrane. All the membranes were synthesized by the present method using tetraethoxysilane in the vapour phase

## Seeding Method

The substrate was dip coated in 2.2wt% silicalite suspension (crystal size ~ 150 nm) at room temperature (33-34°C) for 30 min followed by pulling from the suspension at a rate of 3cm/sec. The procedure was followed for 3 times. The samples were dried in between two consecutive seeding processes at 100°C for 24h. The seeded substrate was then dip-coated in an alkaline solution containing TPAOH and silica (320g TPAOH 1M aqueous solution + 60.084g Fumed silica + 5435 g water) for 10-15 sec, taken out from the solution at a rate of 3 cm/sec and dried at 100°C for 24h. The substrate is the treated at 175°C, under vapor for 24h. This step was taken to ensure the seeds do not get detached from the substrate surface during secondary growth. Total seed loading at this stage was 0.0101 g on 2.84 cm substrate. He permeance after such treatment was  $1136 \times 10^{-7} \text{ mol m}^{-2} \text{ sec}^{-1} \text{ Pa}^{-1}$ . XRD pattern after such treatment is shown in Fig. 2d of the paper. The substrate was then treated for secondary growth to obtain a compact membrane. XRD pattern of the membrane after the secondary growth is shown in Fig. 2e.