

Supplementary information

Structure and permeation of organic-inorganic hybrid membranes composed of poly(vinyl alcohol) and polysilisesquioxane

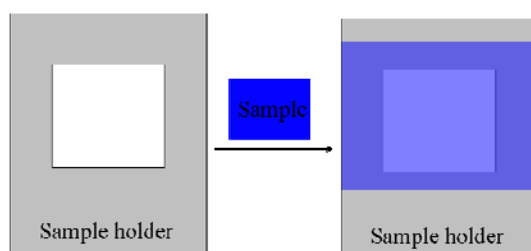
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Part A: Preparation of the samples for XRD, SEM and TEM

XRD: The membrane with thickness of $20 \pm 1 \mu\text{m}$ was fixed on a sample holder with a double-side adhesive tape, as shown in the following figure. The sample holder with a $15 \times 15 \text{ mm}^2$ hole is made of aluminum plate with thickness of 1.5 mm. XRD was performed by X-ray powder diffraction (XRD, Panalytical X'pert, Enraf - Nonious Co. Holland) at 25°C . A Cu $K\alpha$ radiation was used with a step size of 0.0167° and a scan speed of $0.167^\circ \cdot \text{s}^{-1}$ in the range from 5 to 45° .



Schematic diagram of preparation of XRD samples

SEM: A small piece of membrane was fixed on sample stage which is matching to XL30ESEM with a black conductive adhesive. Then, gold was sputtered on the membrane surface since the PVA and hybrid membranes are not conductible. The samples for SEM were then prepared.

TEM: The casting solution of the HM-5 was prepared. Copper net (300 mesh) whose surface was coated with carbon was immersed into the casting solution. A liquid film was formed on the copper net and was then dried to form a solid film. The copper net with the sample was placed into F30 to observe the structure of the HM-5.

Part B: Figures

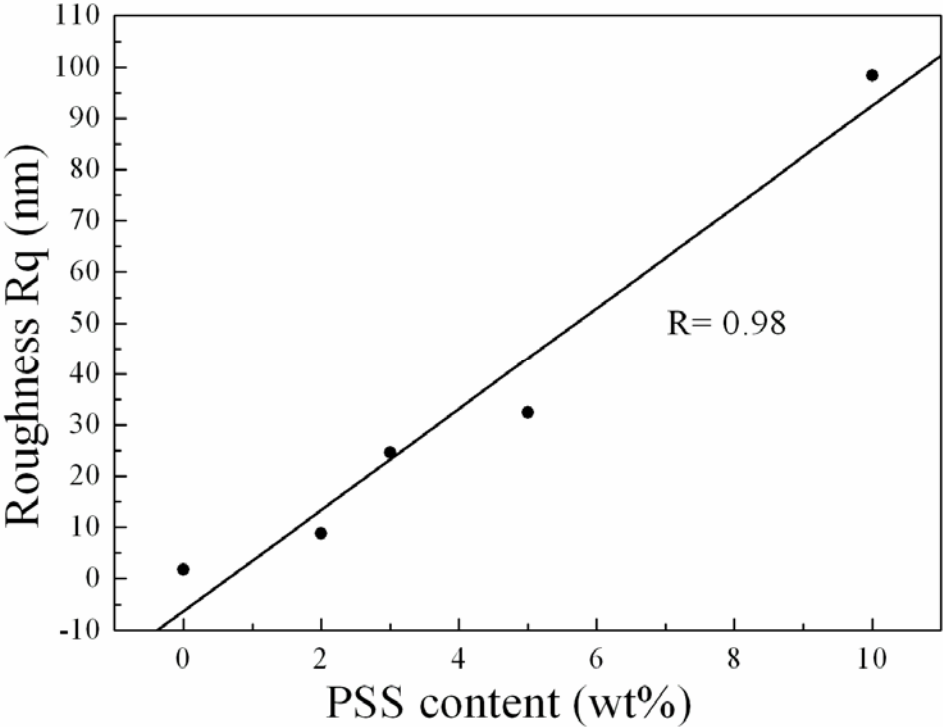
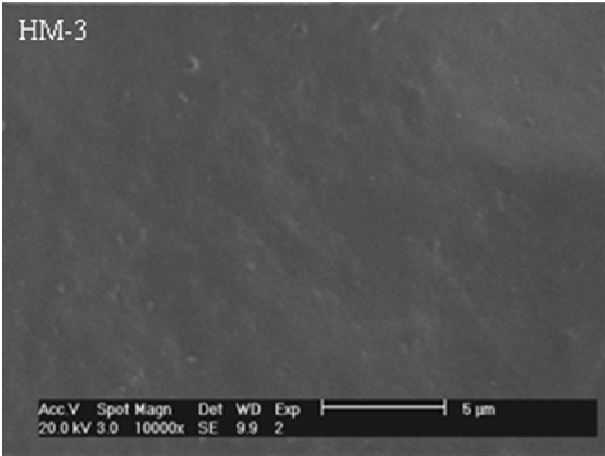
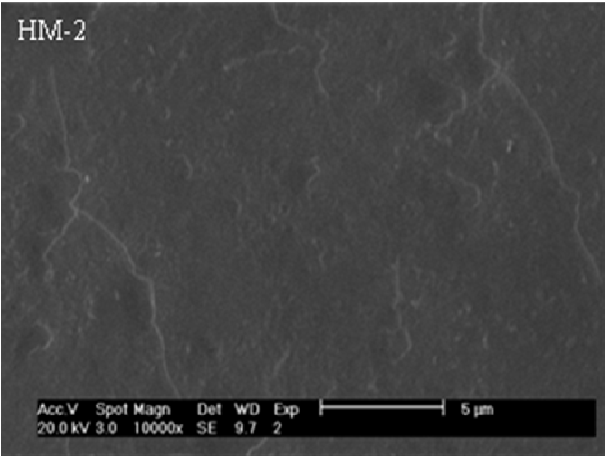


Fig.S1 Relation of the surface roughness of the hybrid membranes with the PSS content



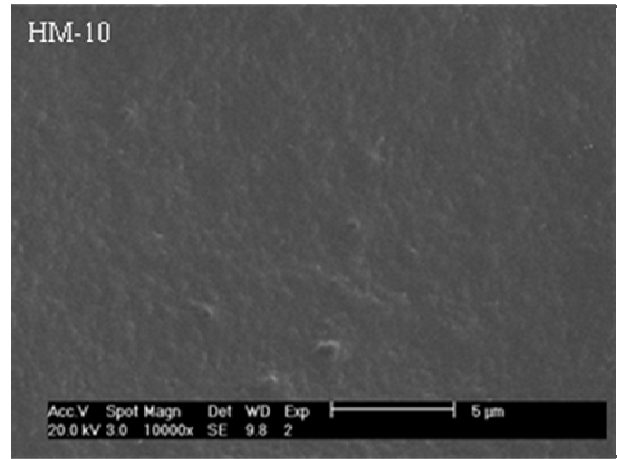
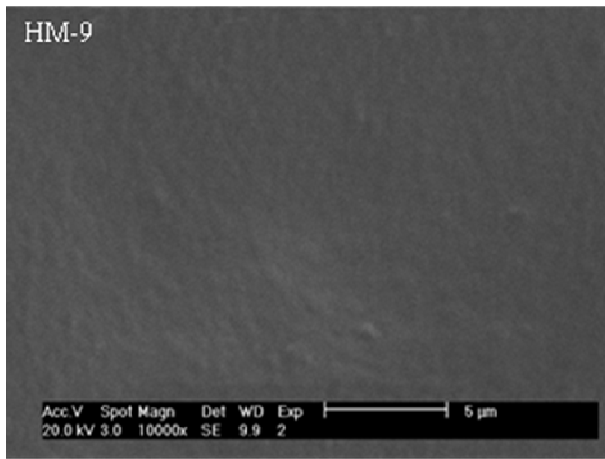
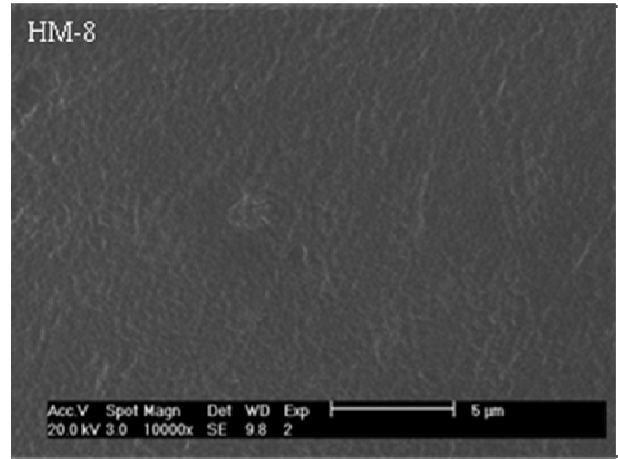
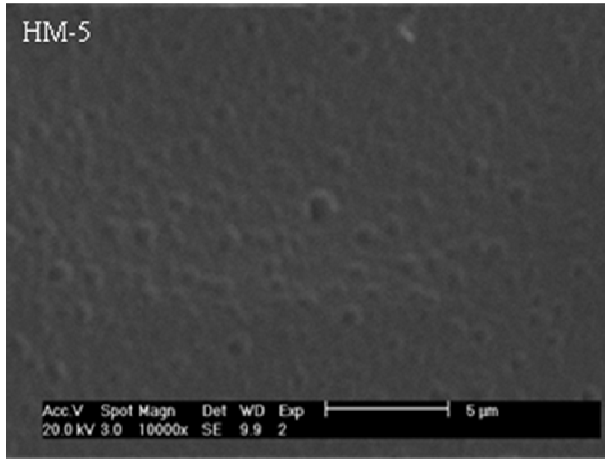


Fig.S2 SEM micrographs of the surface of the hybrid membranes with different PSS loading