Supplementary Information for "High Gas Barrier Imparted by Similarly Charged Multilayers in Nanobrick Wall Thin Films"

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Table S1. Thickness, oxygen transmission rate, and film permeability for PEI/MMT BL and PEI/MMT/PAA TL systems.

	Film Thickness (nm)		OTR ($cm^3/m^2 \cdot day$)		Film Permeability[a] ($cm^3 \cdot cm/cm^2 \cdot s \cdot Pa$)	
Cycles	TL	BL	TL	BL	TL	BL
5	25.3	13.8	3.271	7.316	3.08×10^{-19}	1.68×10^{-18}
10	56.3	44.5	0.034	0.843	4.39×10^{-21}	9.52×10^{-20}
15	73.2	61.9	0.008	0.175	1.34×10^{-21}	2.53×10^{-20}
20	105.8	77.4	0.005	0.037	1.21×10^{-21}	6.57×10^{-21}

[a] Film permeability was decoupled from the total permeability using a previously described method.[1]

QCM data in Figure S1 was used to calculate clay concentration in the film. The mass deposited for deposition cycles 10 – 20 was used to calculate weight percent clay.

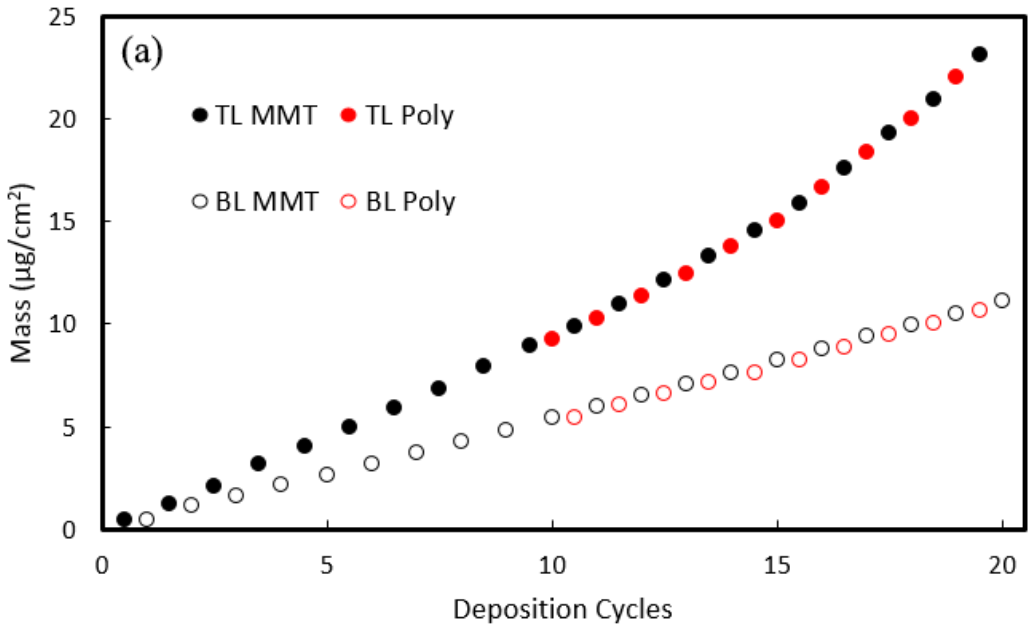

Fig. S1. (a) Thin film mass after polymer and MMT depositions for the bilayer (PEI/MMT) and trilayer (PEI/MMT/PAA) systems and (b) the same systems using high molecular weight PEI.

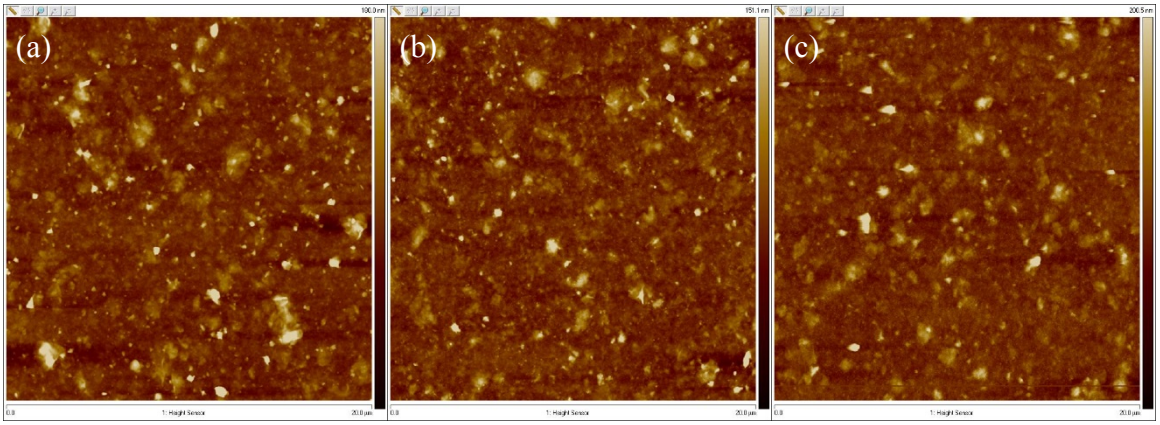

Fig. S2. Atomic force microscope (AFM) topography images of (a) 10 bilayers of PEI/MMT, (b) 10 trilayers of PEI/MMT/PAA without the final PAA layer, and (c) 10 TL of PEI/MMT/PAA.

Reference

1. Nielsen, L. E. Models for the Permeability of Filled Polymer Systems. *Journal of Macromolecular Science: Part A - Chemistry* **1967,** *1* (5), 929-942.