Electronic Supplementary Information

Rational Design of a Highly Efficient Pt/Graphene-Nafion® Composite Fuel Cell Electrode Architecture

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Table S1 BET surface areas for different samples.

Sample	BET surface area/$m^2 g^{-1}$
Pt/GNL-50	3.9
Pt/GNMPS-0	35.2
Pt/GNMPS-25	49.5
Pt/GNMPS-50	21.6
Pt/GNMPS-75	17.1
Pt/GNMPS-95	5.9

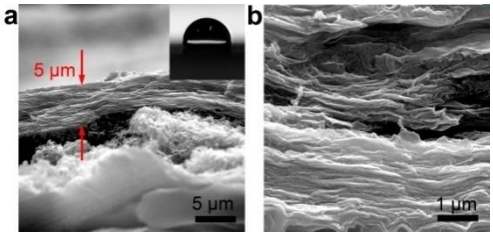

Fig. S1 SEM images of the lamellar structure of Pt/graphene-Nafion® hybrid (Pt/GNL) with the ambient-dried procedure. (a) Cross-section view of Pt/GNL coated on a GDL; inset in (a) is the water wetting behavior performed on the surface. (b) Close-up cross-section view of Pt/GNL.

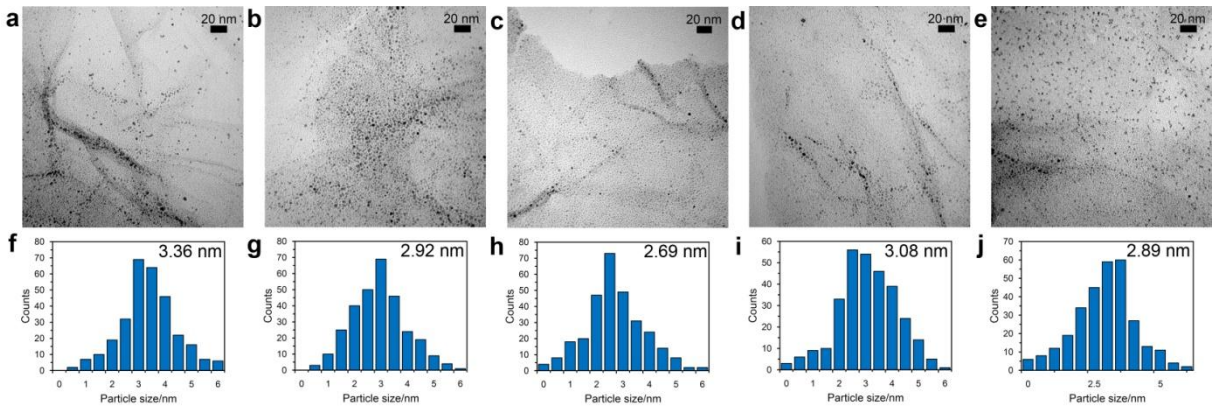

Fig. S2 TEM images of Pt nanoparticles supported on graphene sheets derived from Pt/GNMPS with Nafion® content of (a) 0, (b) 25%, (c) 50%, (d) 75% and (e) 95%. (f)-(j) Corresponding histograms of Pt particle size distributions from (a)-(e).

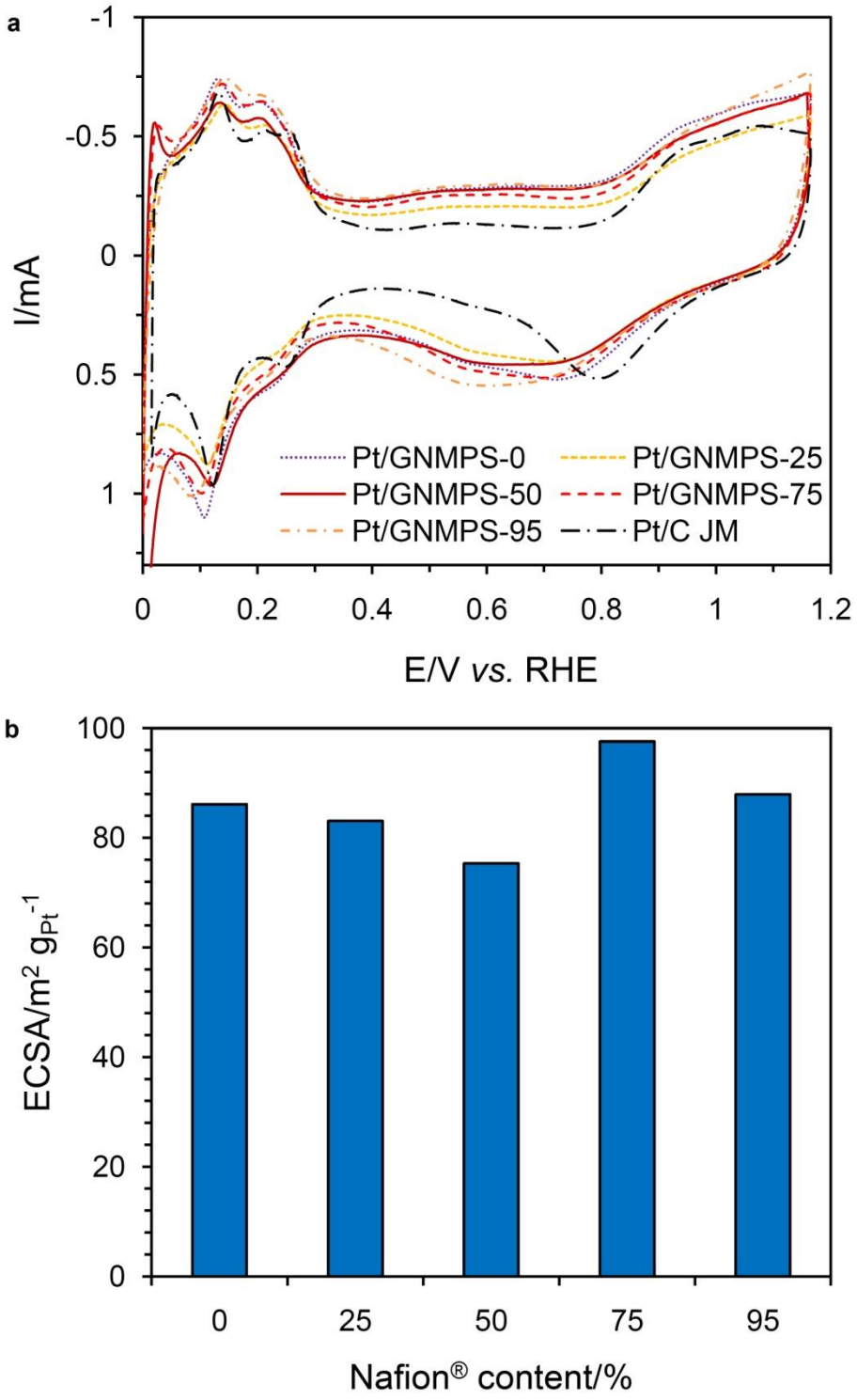

Fig. S3 CV curves (a) for graphene supported Pt with different Nafion® contents performed on a RDE and the corresponding ECSA (b). The scan rate is 50 mV s^{-1}. The electrolyte is 0.5 M H_2SO_4 saturated with pure N_2 at room temperature.

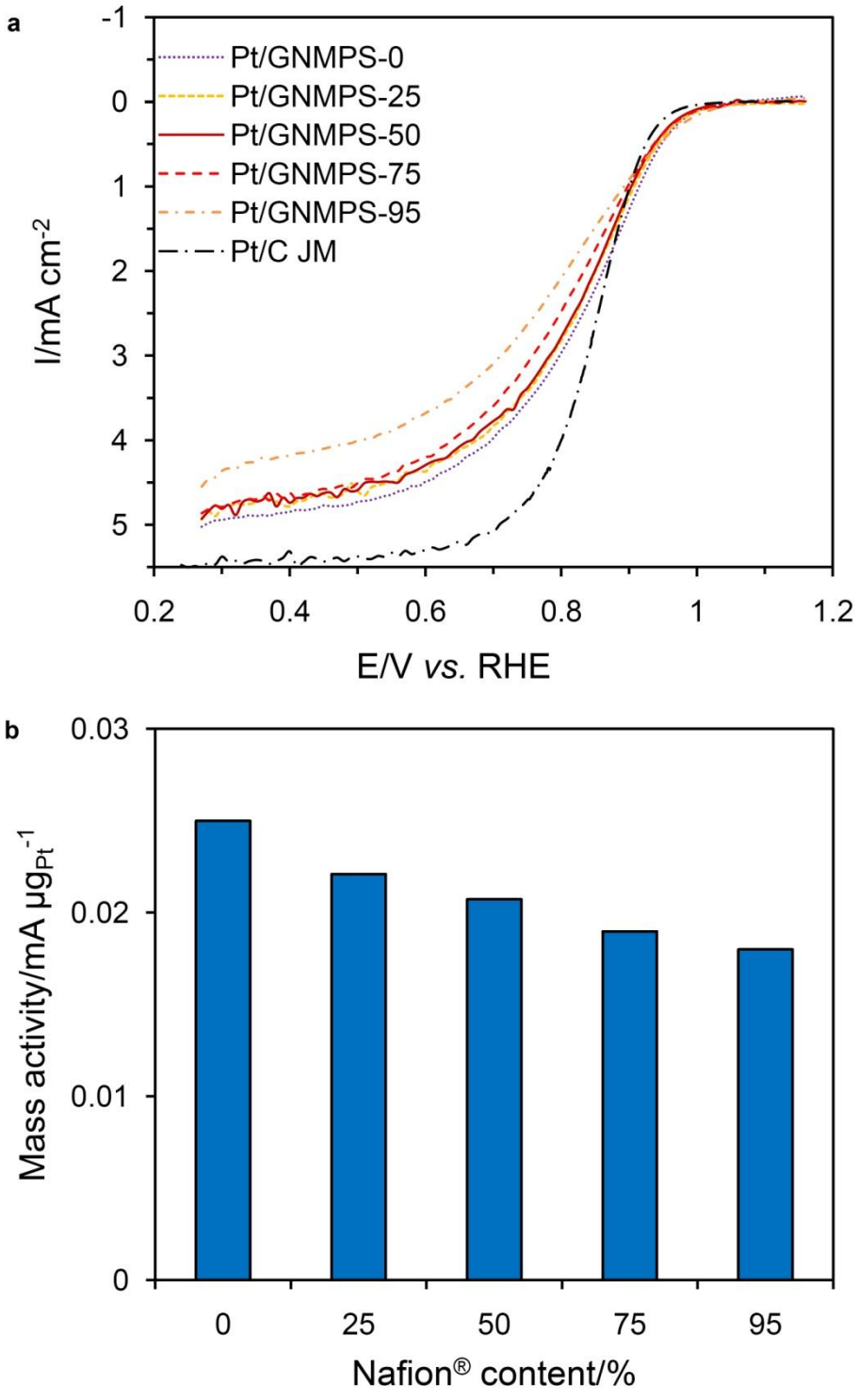

Fig. S4 ORR polarization curves (a) for graphene supported Pt with different Nafion® contents performed on a RDE and the corresponding mass activities (b). The scan rate is 10 mV s^{-1}. The electrolyte is 0.5 M H_2SO_4 saturated with pure O_2 at room temperature.

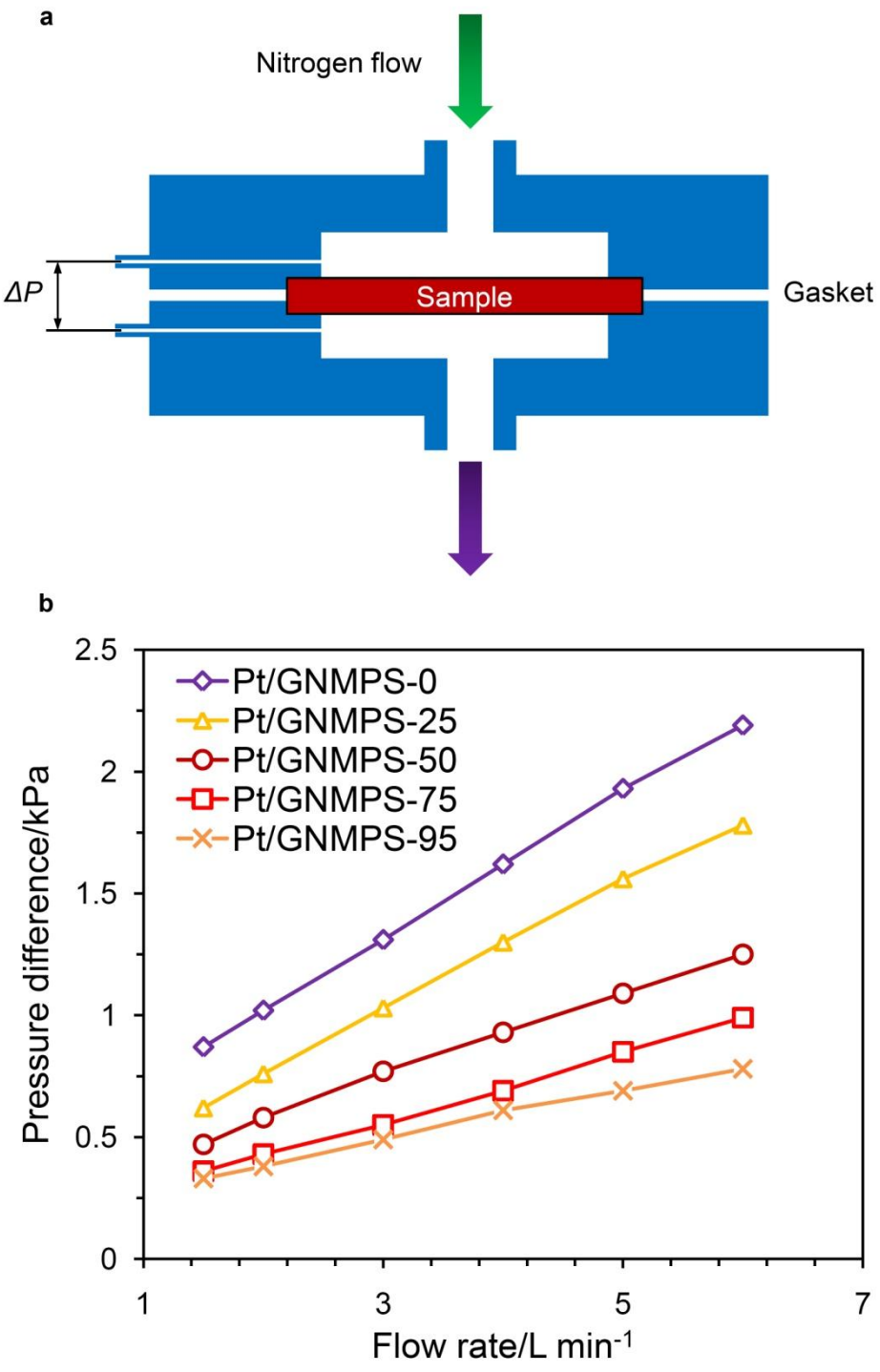

Fig. S5 Gas penetration behaviors of Pt/GNMPS with different Nafion® contents. (a) Schematic of the homemade instrument. (b) Dependence of pressure differences on gas flow rates.