

Supporting information

**One-step synthesis of three-dimensional graphene/ multiwalled
carbon nanotube/Pd composite hydrogel: an efficient recyclable
catalyst for Suzuki coupling reactions**

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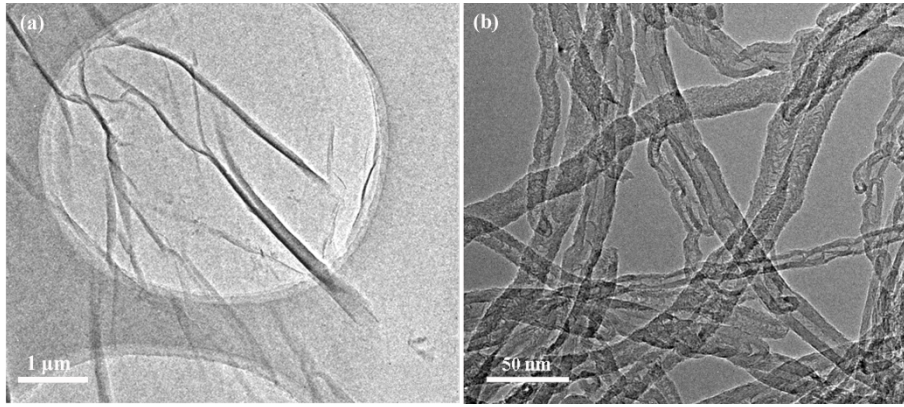


Fig. S1 TEM images of the as-prepared GO (a) and MWCNTs (b).

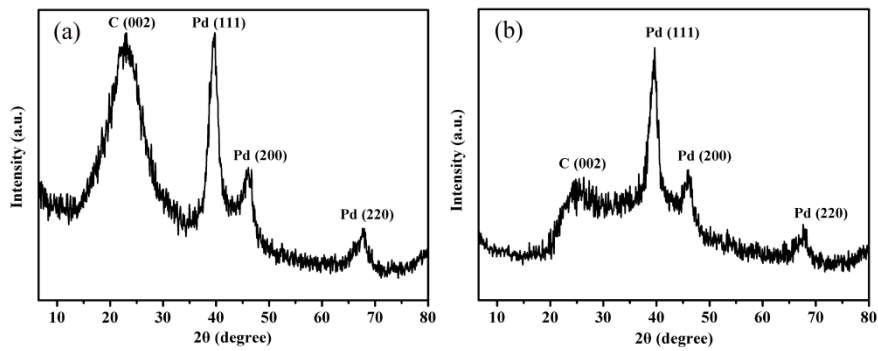


Fig. S2 XRD patterns of the rGO/Pd (a) and MWCNTs/Pd (b) composites.

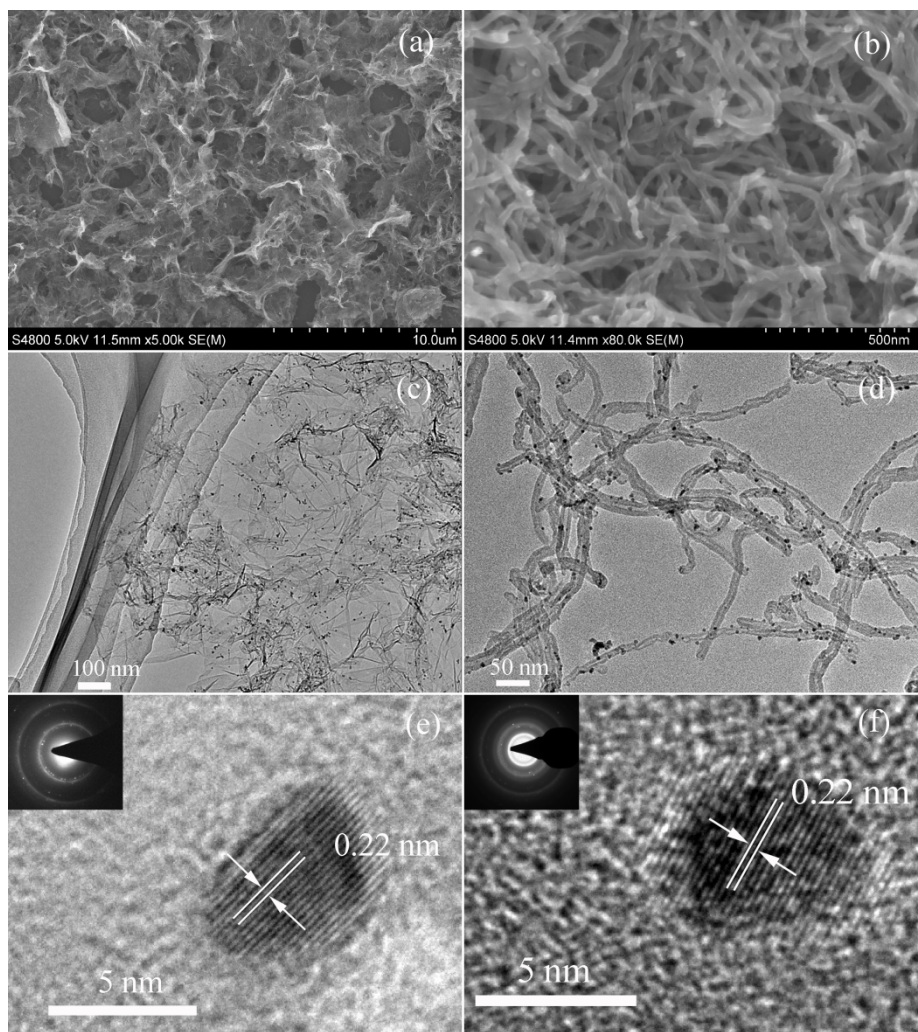


Fig. S3 SEM images of (a) rGO/Pd and (b) MWCNTs/Pd. TEM images of (c) rGO/Pd and (d) MWCNTs/Pd. Representative HRTEM images of (e) rGO/Pd and (f) MWCNTs/Pd. Inset shows the corresponding SAED pattern.

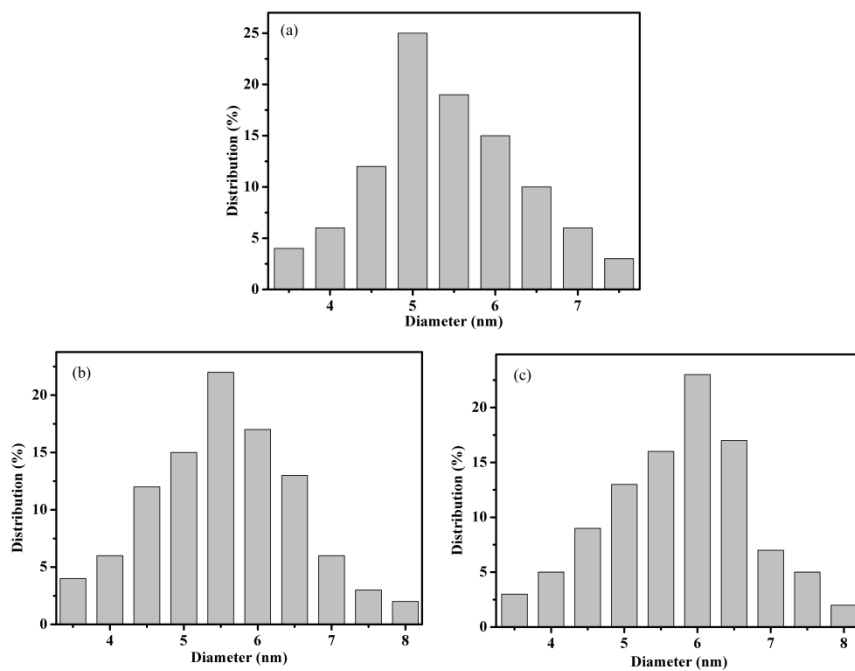


Fig. S4 The size distribution of Pd NPs on (a) G/MWCNTs/Pd, (b) rGO/Pd and (c) MWCNTs/Pd.

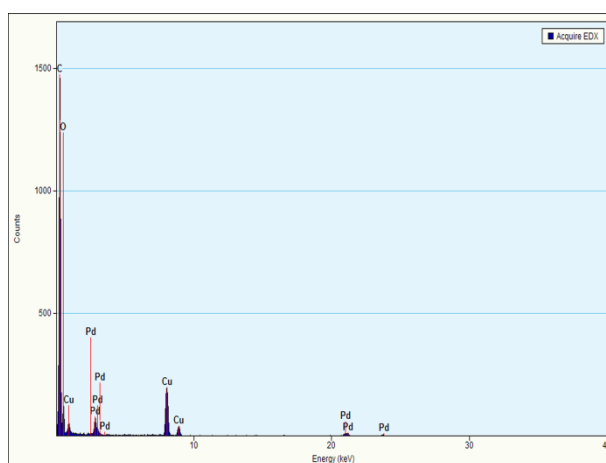


Fig. S5 The EDX pattern of the G/MWCNTs/Pd composites.

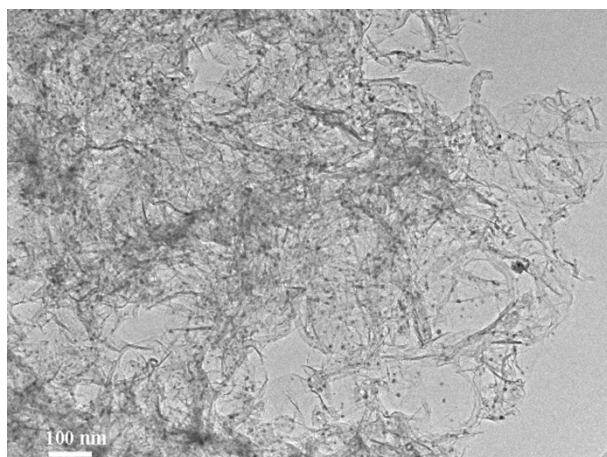


Fig. S6 TEM image of the G/MWCNTs/Pd composites after six runs of recycling experiments.

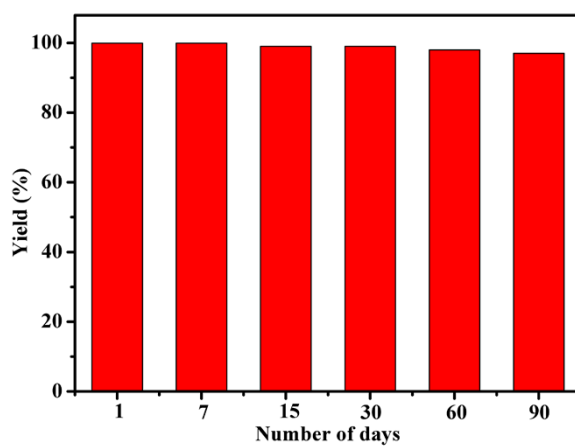


Fig. S7 Stability of the G/MWCNTs/Pd catalyst for the Suzuki cross-coupling reaction of iodobenzene with phenylboronic acid in three months.

Table S1 Performance of different supported Pd catalysts for the reaction of aryl halide with phenylboronic acid

Aryl halide	Catalyst	Yield (%) (Time/h)	Yield (%) (Time/h) this work	Ref.
iodobenzene	NHC-Pd/GO-IL	98 (2.5)	>99 (1/4)	54
	Pd NPs-HNG	98 (2.5)	>99 (1/4)	55
bromobenzene	Pd NPs-HNG	94 (2.5)	95 (1)	55
	Pd _{np} @MNP	97 (4)	95 (1)	56
4-nitrobromobenzene	Pd _{np} @MNP	99 (3)	98 (1)	56
	Pd-Ni(20)/RGO	68.6 (24)	98 (1)	57