Electronic Supplementary Information (ESI)

Selective Cu_4Pd alloy nanoparticles anchoring on amine functionalized graphite nanosheet and its use as reusable catalyst for C–C coupling reaction with sacrificial role of Cu for Pd–regeneration

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Table S1 Composition of Cu–Pd alloy determined from different analytical techniques.

Analysis technique	**Composition**
ICP	$Cu_{0.82}Pd_{0.18}$
XRD	$Cu_{0.82}Pd_{0.18}$
XPS	$Cu_{0.81}Pd_{0.19}$
EDS	$Cu_{0.80}Pd_{0.20}$

Table S2 Percentage yields in five consecutive cycles of C–C coupling reaction with PhI and PBA using different catalysts.

Catalyst name	**Isolated Yield %**				
	First cycle	Second cycle	Third cycle	Fourth cycle	Fifth cycle
Cu_4Pd@AFGNS	79	80.5	72	70	70
Pd@AFGNS	83.5	49.5	–	–	–

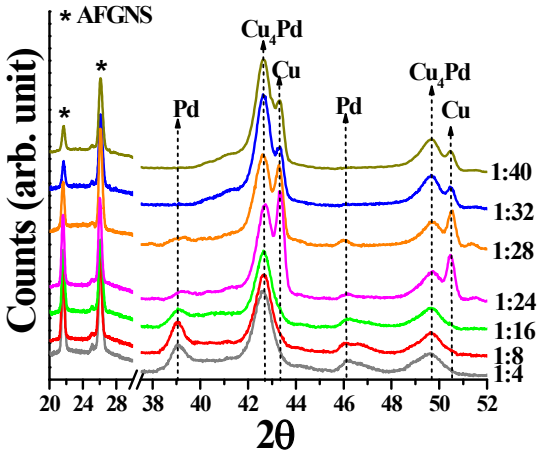

Fig. S1 Solvothermal reaction carried out with different molar ratio of $PdCl_2$: $CuCl_2 \cdot H_2O$ for optimization of the reaction parameter

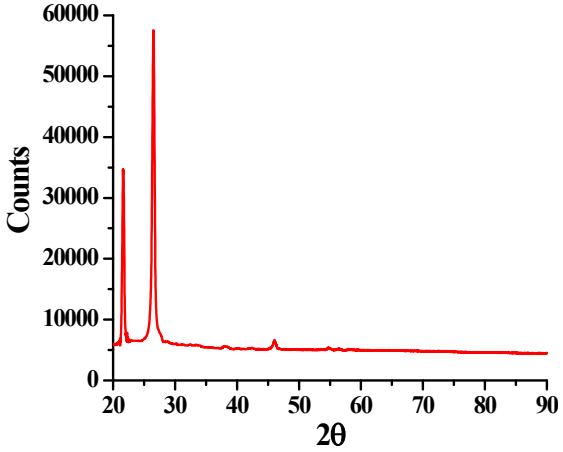

Fig. S2 XRD pattern of AFGNS.

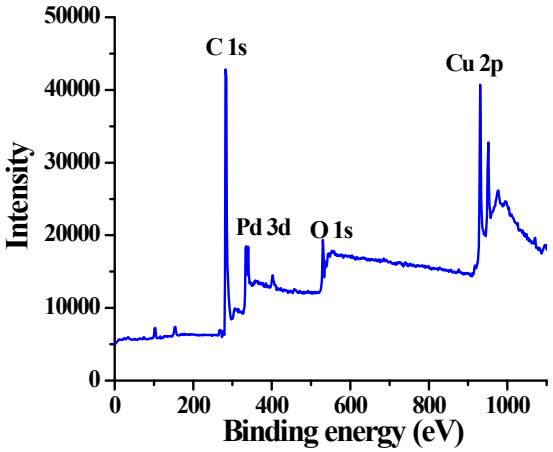

Fig. S3 XPS survey scan of Cu_4Pd@AFGNS.

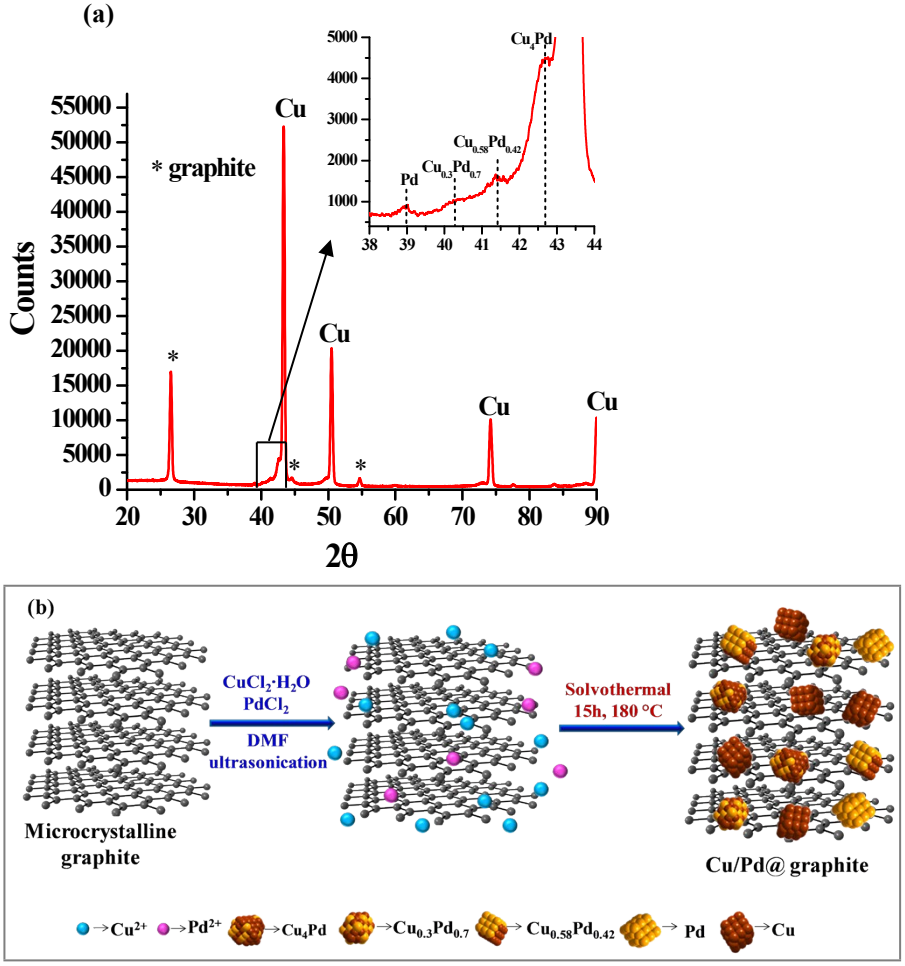

Fig. S4 (a) XRD pattern of Cu/Pd@graphite with a portion of the spectrum magnified in the inset and (b) schematic representation of synthesis of Cu/Pd@graphite.

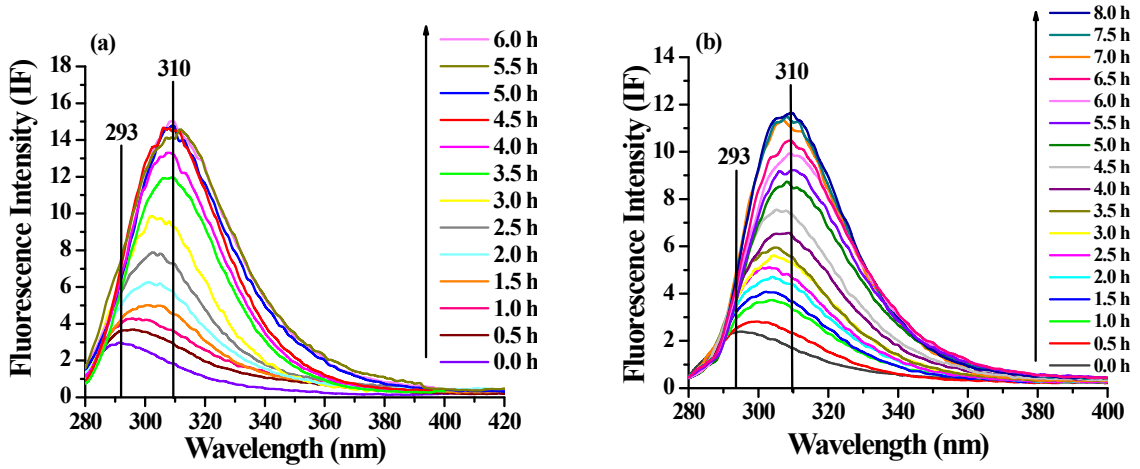

Fig. S5 Successive fluorescence spectra of the C–C coupling reaction at 50 °C in the presence of the Cu_4Pd@AFGNS catalyst between phenylboronic acid and (a) bromobenzene (PhBr), (b) chlorobenzene (PhCl).

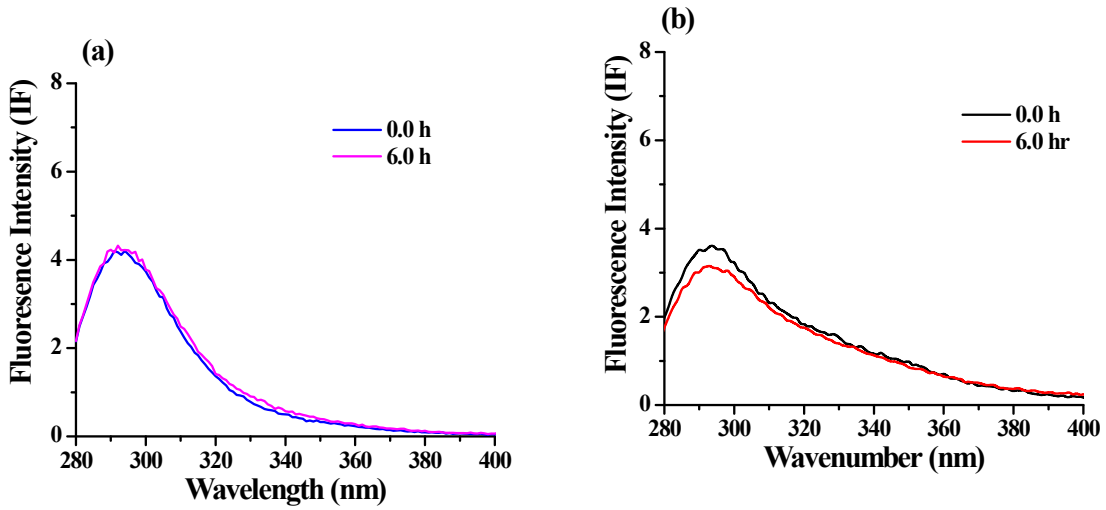

Fig. S6 Fluorescence spectra of the C–C coupling reaction carried out (a) in absence of catalyst and (b) with AFGNS in absence of any alloy or metal NPs.

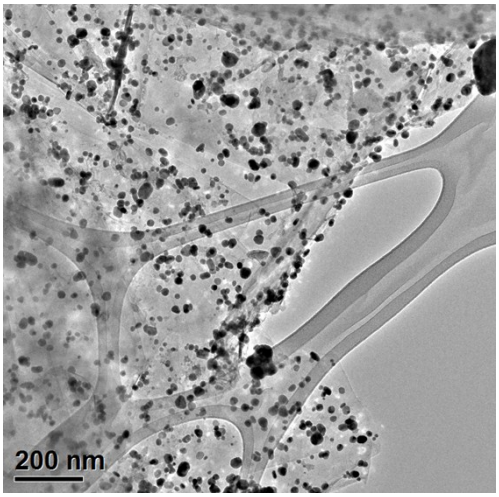

Fig. S7 TEM image of Cu_4Pd@AFGNS catalyst after five cycles of C–C coupling reaction with PhI and PBA.