

SUPPORTING INFORMATION

Isotropic and oriented copper nanoparticles supported on graphene as aniline guanylation catalysts

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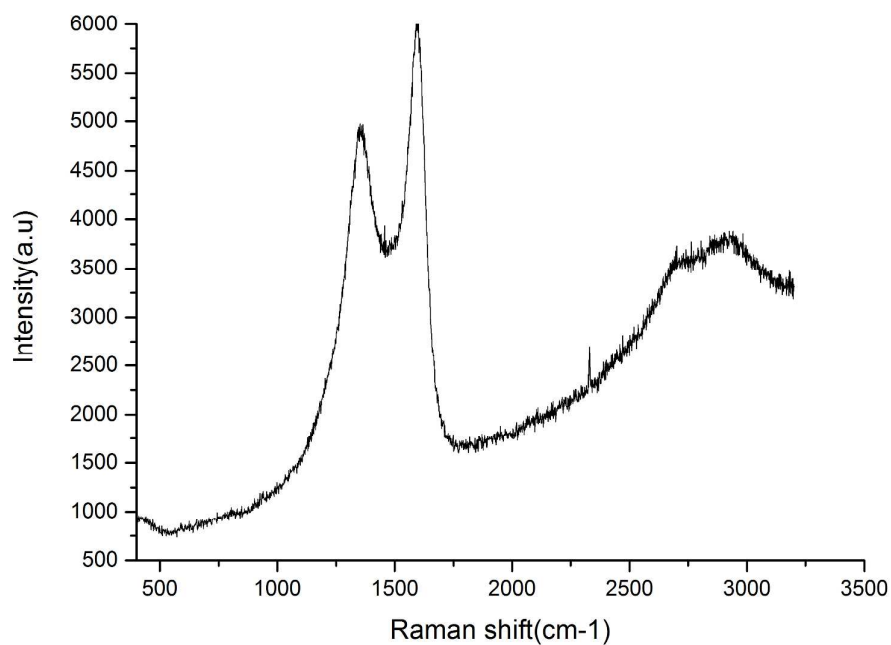


Figure S1. Raman spectrum of Cu/G powders recorded upon excitation at 612 nm.

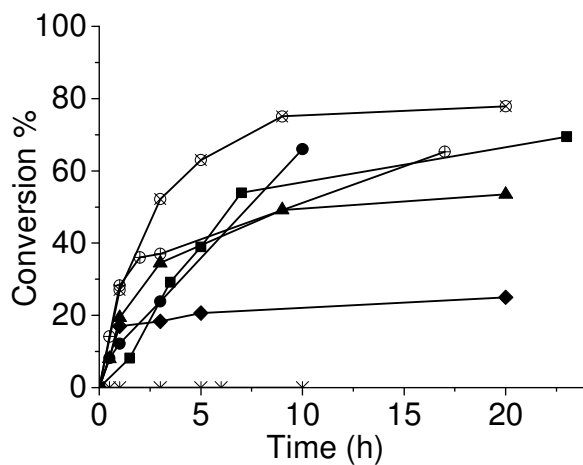


Figure S2. Time-conversion plot for the guanylation of aniline with N, N'-diisopropylcarbodiimide catalyzed by Cu/G. * EDC; ● p-xylene; ▲ dimethyl carbonate; ⊕ Dioxane; ■ DMF; ◆ CH₃CN; ⊗ Toluene; Reaction conditions: aniline (0.15 mmol), N, N'-diisopropylcarbodiimide (0.24 mmol), catalyst (8 mol %), temperature (150 °C) and solvent (0.5 ml).

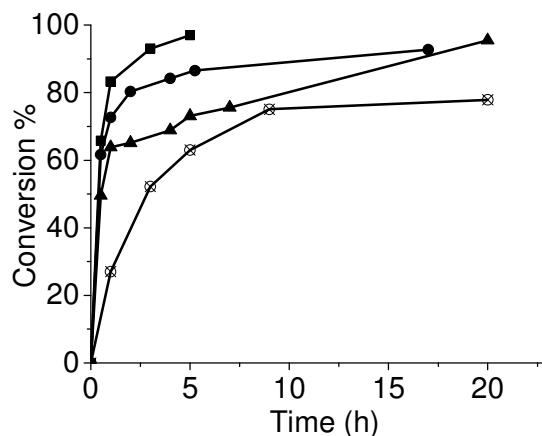


Figure S3. Time-conversion plot for the guanylation of aniline by N, N'-diisopropylcarbodiimide as a function of the Cu-to-aniline ratio. ■ 8 mol %; ● 12 mol %; ▲ 6 mol %; ⊗ 4 mol %; Reaction conditions: aniline (0.15 mmol), carbodiimide (0.24 mmol), temperature (150 °C), solvent (0.5 ml).

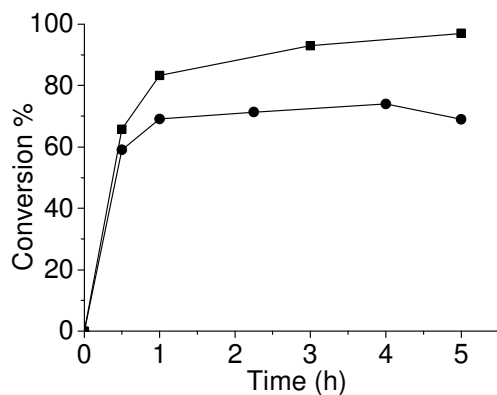


Figure S4. Hot filtration test. Comparison of the temporal conversion plot of aniline for guanylation by N, N'-diisopropylcarbodiimide using Cu/G as catalyst. The catalyst was filtered at 30 min reaction time in one of the twin reactions and the mixture without catalyst allowed to react in the absence of Cu/G. ■) normal reaction; ●) hot filtration test; Reaction conditions: catalyst (8 mol %), aniline (0.15 mmol), carbodiimide (0.24 mmol), toluene (0.5 ml), temperature (150 °C).

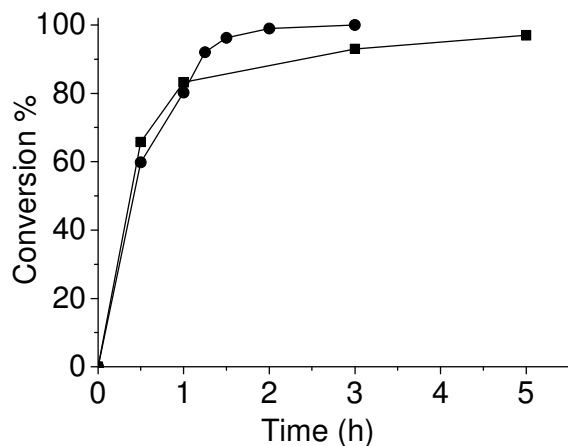


Figure S5. Time-conversion plot for aniline guanylation with N, N'-diisopropylcarbodiimide catalyzed by Cu/G. After 1h additional amount of Cu/G was added in one of the runs. ■) Cu/G; ●) Experiment with addition of a supplement of fresh catalyst; Reaction conditions: catalyst (8 mol %), aniline (0.15 mmol), carbodiimide (0.24 mmol), toluene (0.5 ml), temperature (150 °C). In one of the runs a second 1 mol % catalyst was added.

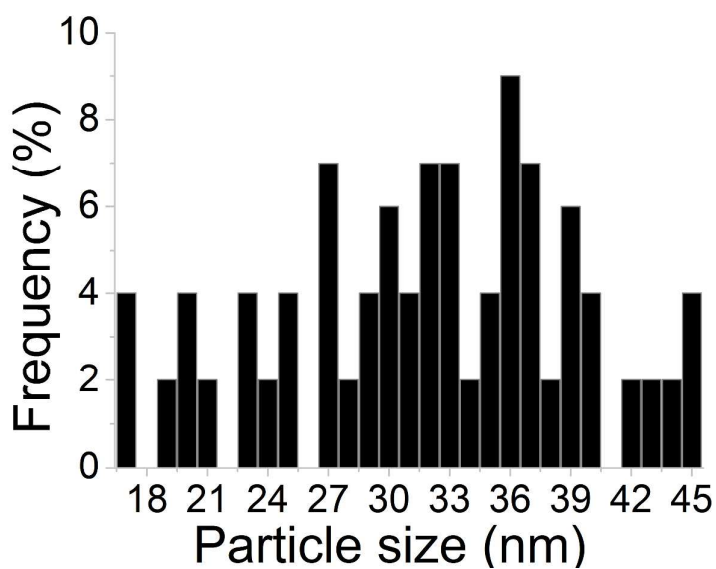


Figure S6. Lateral size particle size distribution of oriented Cu nanoplatelets in $\overline{\text{Cu}}/\text{fl-G}$ films.

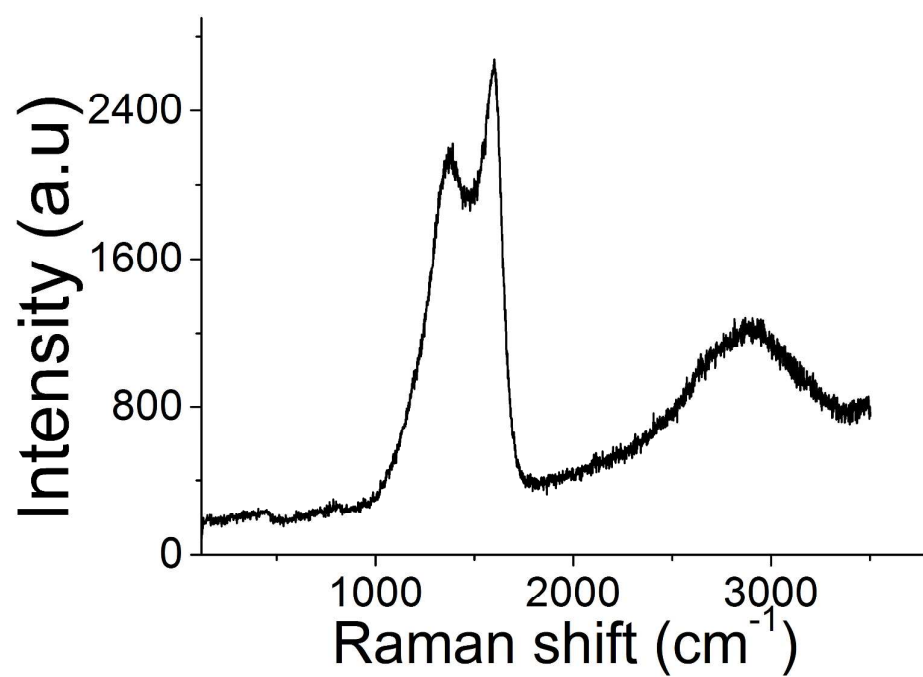


Figure S7. Raman spectrum recorded for $\overline{\text{Cu}}/\text{f1-G}$ films upon excitation at 612 nm.