Supporting information

# Topotactic Conversion of Calcium Carbide to High-Crystalline Few-Layer Graphene in Water

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## Figures and caption

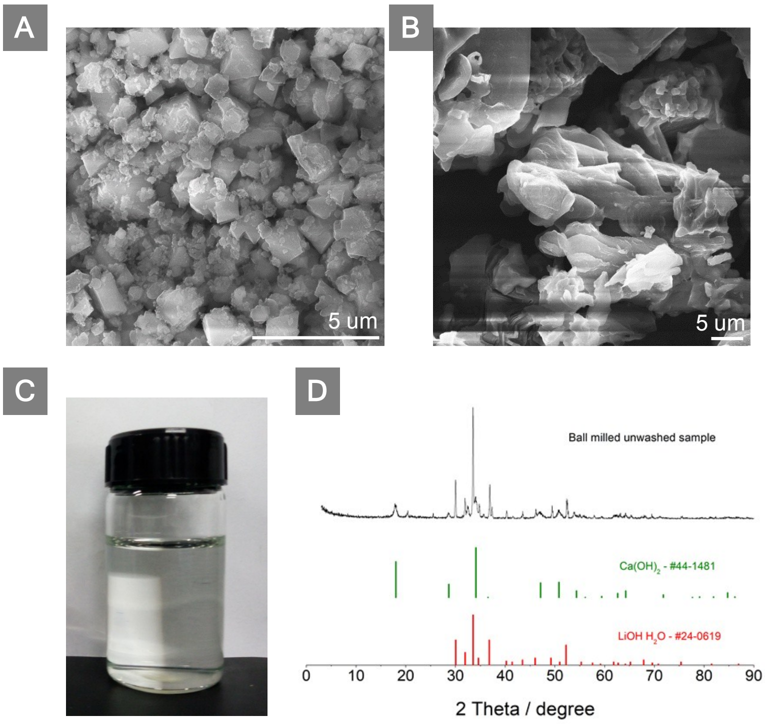


**Figure S1.** SEM images of ball-milled product of $CaC_2$/LiOH (A) before and (B) after acid washing. (C) Digital image of acid-washed ball-milled product of $CaC_2$/LiOH. (D) XRD profile of ball-milled product of $CaC_2$/LiOH.

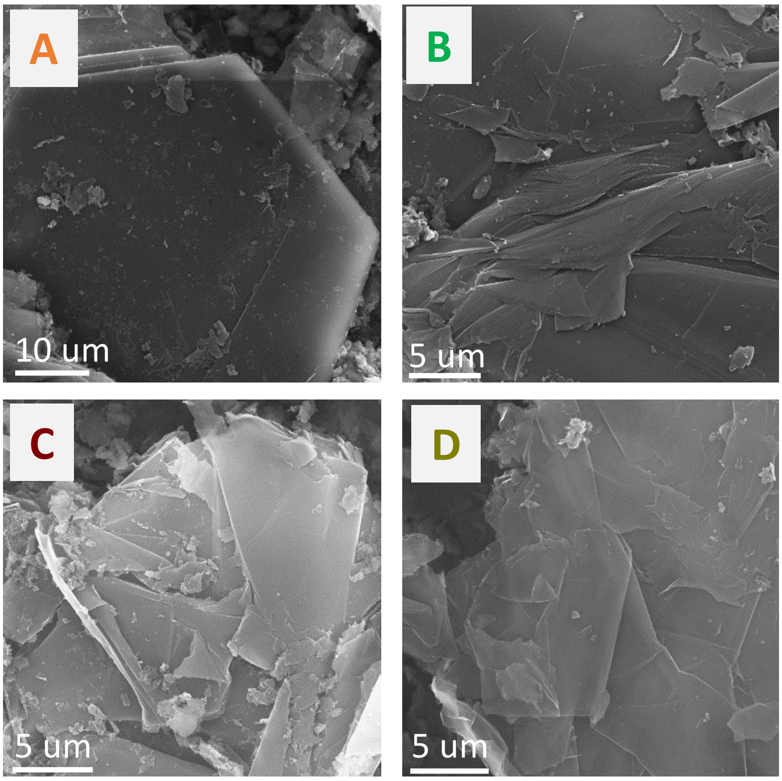


**Figure S2.** SEM images of graphene materials prepared using different H-containing solvent or solution: (A) diluted HCl solution, (B) $H_2O$, (C) acetic acid, and (D) ethylene glycol.

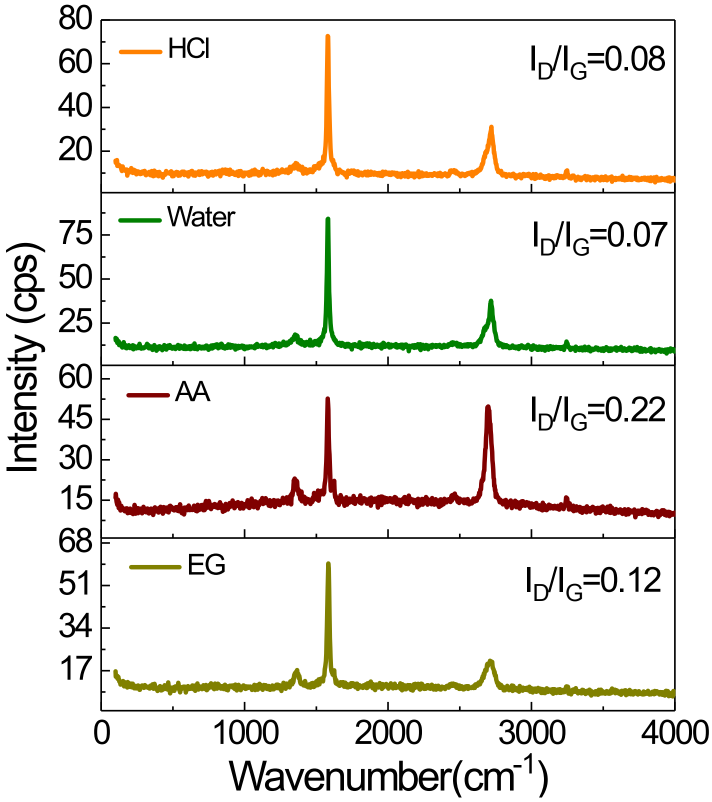


**Figure S3**. Raman spectra of graphene materials prepared using different H-containing solvent or solution: diluted HCl solution, $H_2O$, acetic acid (AA), and ethylene glycol (EG).

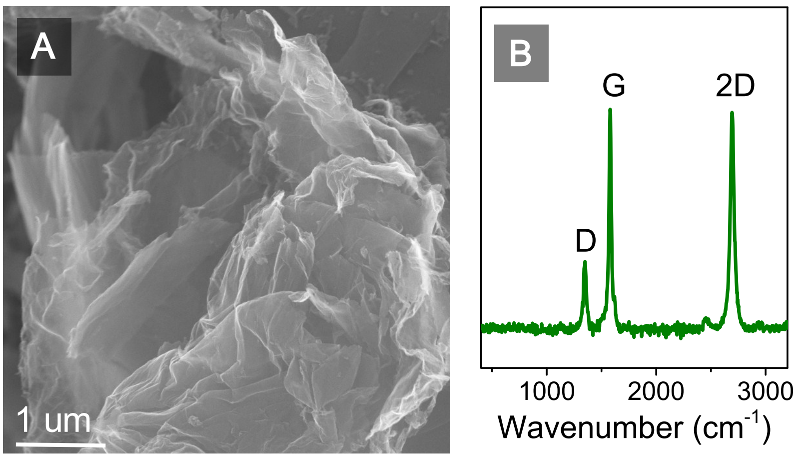


**Figure S4**. (A) SEM images of FLG after re-suspension and centrifugation. (B) Raman spectra of upper-layer FLG.

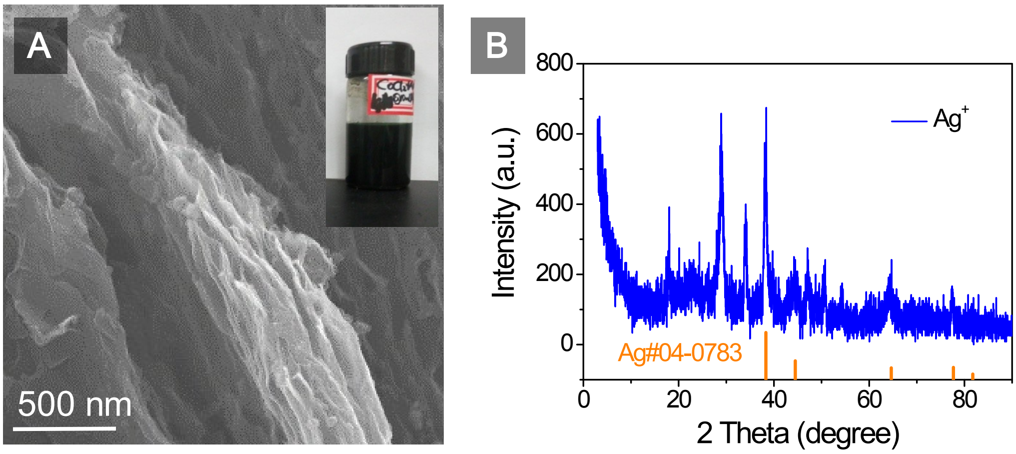


**Figure S5.** (A) SEM image and (B) XRD profile of $Ag^+$-promoted synthesized FLG, inset of (A) shows the typical suspension after $CaC_2$ reacting with $Ag^+$ in DMF.

**Table S1.** Yields of few-layered graphene using different H-containing solvents or solution.

| **Name** | **Reaction rate** | **Yield (‰)** |
|---|---|---|
| Diluted **HCl** | Very fast | 9.6 |
| **Water** | Fast | 9.7 |
| **A**cetic **A**cid | Mediate | 4.7 |
| **E**thylene **G**lycol | Slow | 0.16 |