

Direct synthesis of few-layer graphene on NaCl crystals

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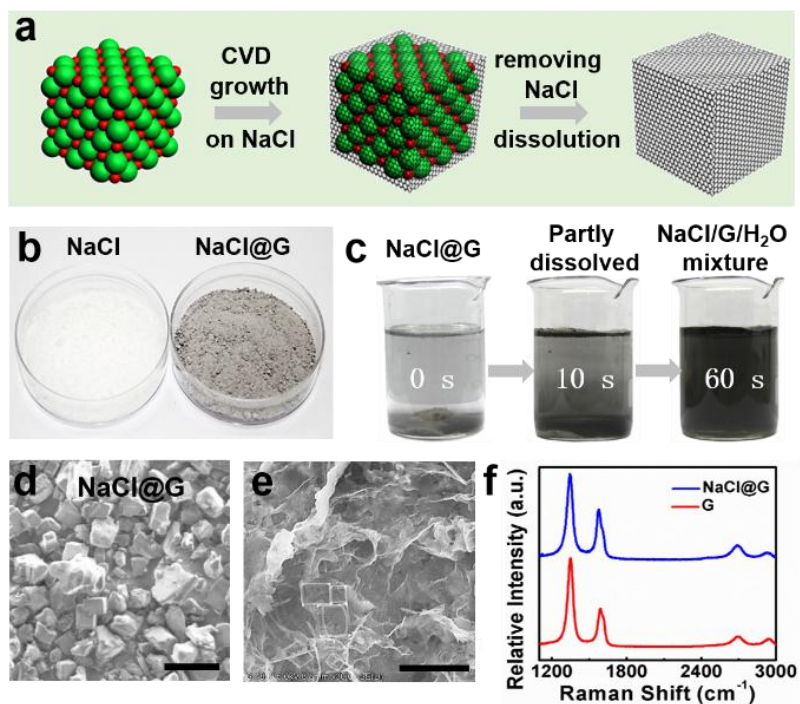
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Abstract

Chemical vapor deposition (CVD) on either metallic or dielectric substrates is one of the most promising methods for obtaining high-quality graphene. However, the removal of growth substrates is quite inconvenient, time-consuming, and always cause additional contamination, which will hamper their practical applications and lower their significance for low-cost production.

We demonstrated that, NaCl crystals can serve as novel substrates for few-layer graphene growth *via* a facile low temperature CVD method. The water-soluble nature of NaCl makes it convenient to produce free standing graphene layers *via* a facile and low-cost approach. Unlike traditional metal-catalyzed or oxygen-aided growth, the micron-size NaCl crystal planes play an important role for the nucleation and growth of few-layer graphene. Moreover, the possibility of synthesizing cuboidal graphene is also demonstrated in the present approach for the first time. The few-layer graphene synthesized using the present method have an adsorption ability for anionic and cationic dye molecules in water. The present synthesis method may pave a facile way for manufacturing few-layer graphene powder on a large scale.

Figures



a. Schematic view of graphene growth on a NaCl crystal. b. Photograph of NaCl powder before (left) and after (right) CVD growth. c. Photographs of the dissolving process of

NaCl@Graphene in water for 0 s, 10 s, and 60 s. **d, e.** SEM images of NaCl@Graphene crystals and graphene powder respectively. **f.** Raman spectra of as-grown NaCl@Graphene (blue) and graphene product (red, after removing the NaCl substrate). Scale bars: 20 μm (**d**), 1 μm (**e**).

References

[1] L. Shi, K. Chen, R. Du, et al. *Small*, DOI: 10.1002/sml.201502013.