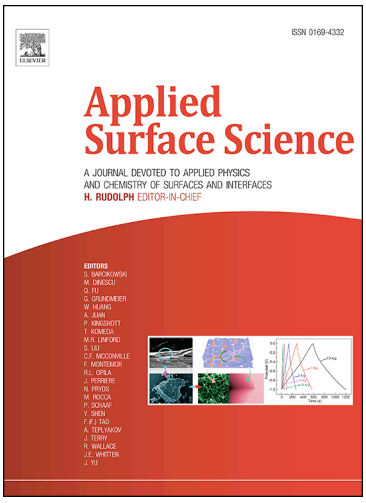

Full Length Article

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Mutual modulation of F-distribution and N-configuration in F and N dual-functionalized graphene

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ABSTRACT

Fluorination and N-doping are two feasible routes to modify the properties of graphene. However, it's difficult to modulate the F-distribution and N-configuration. Here, we found that by the mutual influence between F and N atoms, F-distribution and N-configuration can be facilely modulated. In brief, by annealing F and N dual-functionalized graphene, (i) F-distribution tended to be discrete, and (ii) graphitic N-configuration was progressively converted to pyridinic, and pyridinic to pyrrolic N-configuration. Theoretical calculations indicated that the modulation of F-distribution was due to the adsorptive ability of N atoms, and N-configuration was modulated because F decreased the stability of N-configuration. Furthermore, we found that the mutual modulation of F-distribution and N-configuration could reinforce the radiative recombination of electron-hole pairs, which increased the photoluminescence intensity to 320.69%. This work provides a facile strategy to modulate the distribution and configuration of heteroatoms, broadening the potential applications of dual-functionalized graphene.

KEYWORDS: mutual modulation; dual-functionalized graphene; F-distribution; N-configuration;

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