Plasma-induced high-efficient preparation of heteroatom doped functional energy materials

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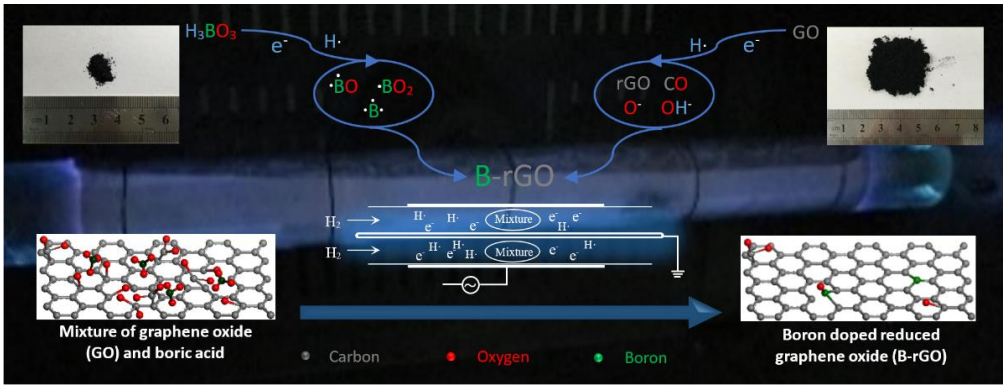
The design and synthesis of new materials for various energy conversion applications have been regarded as a promising strategy for addressing the increasing challenges in energy demands and environmental concerns due to the excess consumption of fossil fuels. [1] Accordingly, numerous functional energy materials were studied during the past decades, and a series of modification method were developed to further enhance the special applications of these functional materials. [2] In particular, heteroatom doping has been demonstrated to be an effective way to tune the functions of nanomaterials including chemical reactivity, electronic and optical performance. [3] In this study, nitrogen and boron doped reduced graphene oxide (rGO) for electrode materials and boron doped rGO/g-C3N4 nanocomposites for photocatalytic degradation catalysts were fabricated via a facile dielectric barrier discharge (DBD) plasma route. The process has the features of low cost, environmentally friendly, and scalability. The as-synthesized functional materials exhibited exceptional electrical and photocatalytic performance. A collision mechanism was detailed to be responsible for the facile pathway (Figure in this page shows a typical boron doping process). This work presents an idea that boron doping may be an effective method to promote the covalent bonds in the hybrid composites, which is important for developing and designing new functional nanomaterials.



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