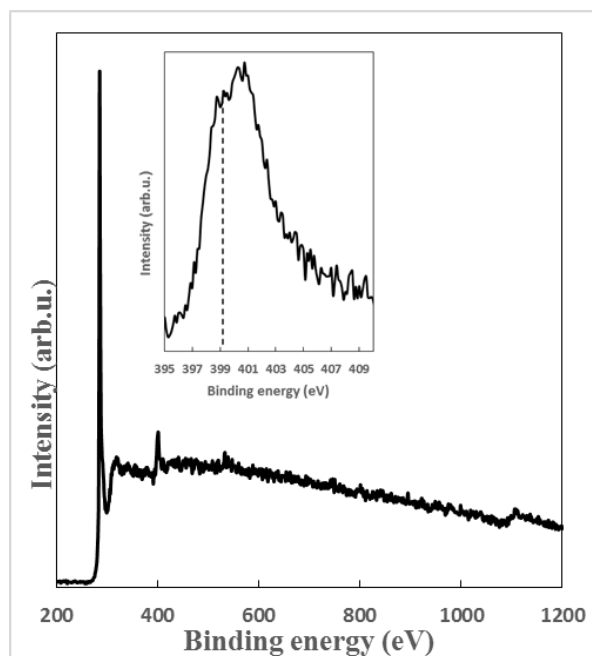


Nitrogen Doping of Graphene

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Doping of graphene with nitrogen is expected to introduce additional n-type carriers in carbon system. Nitrogen doped graphene is a promising candidate for applications in fuel cells, lithium batteries and electrochemical bio-sensing. Many approaches have been made to dope graphene with N and recently, Gopalkrishna et al. used microwave synthesis and perform promising application in supercapacitor¹. Here, we employed microwave surface wave chemical vapor deposition system to grow nitrogen doped graphene at low temperature (600°C) using nitrogen gas as a dopant.

Fig. 1 shows XPS spectrum of nitrogen doped graphene on Cu. In the survey scan of XPS, two main peaks C 1s and N 1s are visible and centered at 284.6 and 400.5 eV respectively. Enlarged N 1s peak in the inset shows that nitrogen content in the graphene is due to graphitic nitrogen in the graphene sheets, which corresponds to the highly coordinated nitrogen atoms that replaced carbon atoms within the graphene sheets². Signal of pyridinic nitrogen (peak around 398 eV), whose doping effect is much weaker than that of graphitic nitrogen, is negligible as shown in the N 1s spectrum.



In conclusion, we doped graphene with nitrogen and confirmed the electronic doping of graphene with graphitic nitrogen.

References

1. K. Gopalkrishna et al. J. Mater. Chem. A 2013, 1, 7563-7565
2. L.S. Panchokarla et al. Adv. Mater. 2009, 21, 4726-4730

Fig. 1 XPS spectrum of N doped graphene. Inset: enlarged spectrum of N 1s signal. Atomic concentration of N is 7.9 %