Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting information

Synergetic effects of edge formation and doping sulfur on the catalytic activity of graphene-based catalyst for oxygen reduction reaction

SeKwon Oh,[a] JongHun Kim,[b, c] MinJoong Kim,[a] Dohwan Nam,[a] JeongYoung Park, [*b, c] EunAe Cho,[*a] and HyukSang Kwon[*a]

[a] *Dept. of Materials Science and Engineering, KAIST, Daejeon, 305-701, Republic of Korea.*

[b] *Center for Nanomaterials and Chemical Reactions, Institute for Basic Science, Daejeon 305-701, Republic of Korea*

[c] *Graduate School of EEWS, KAIST, Daejeon, 305-701, Republic of Korea*

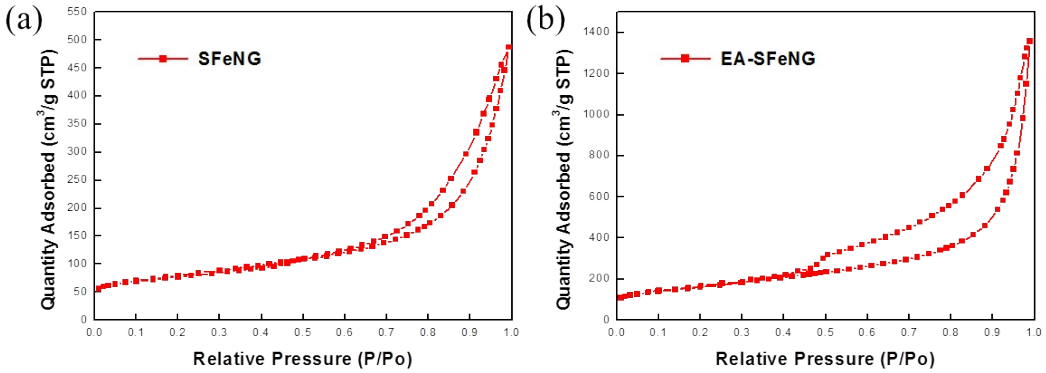

Fig. S1 BET surface area plot of (a) S doped Fe-N-graphene (SFeNG) and (b) edge activated S doped Fe-N-graphene (EA-SFeNG).

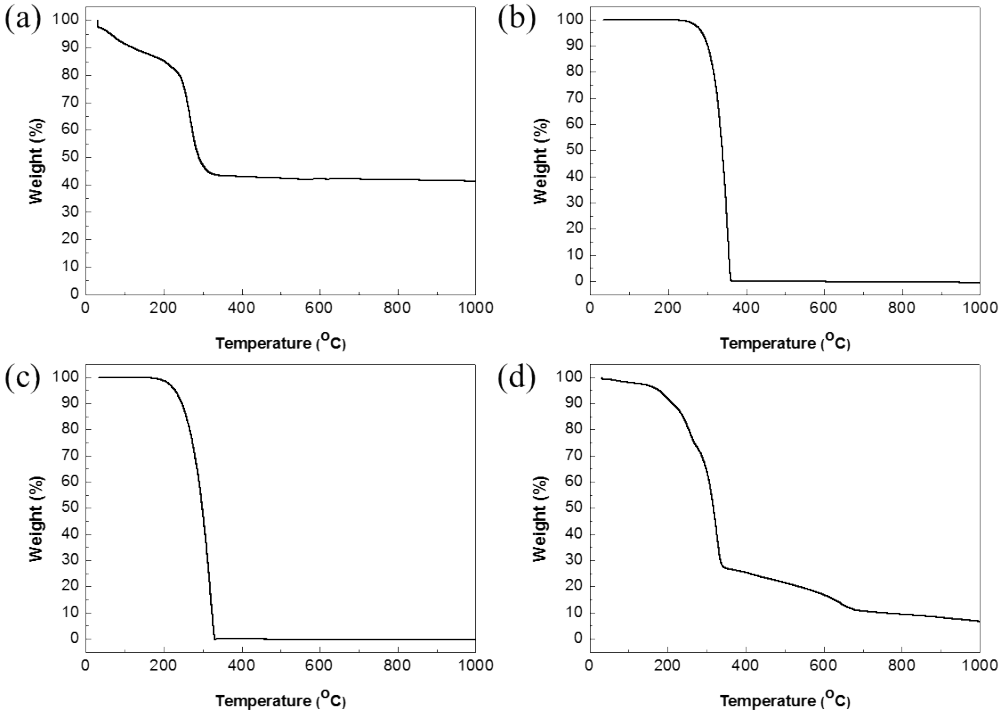

Fig. S2 Thermogravimetric analysis (TGA) graphs of (a) Fe acetate,(b) Melamine, (c) Sulfur, (d) mixture of Fe acetate, melamine, sulfur and GO after ball milling for 5h obtained with a ramping rate of 10 °C min^{-1} in nitrogen.

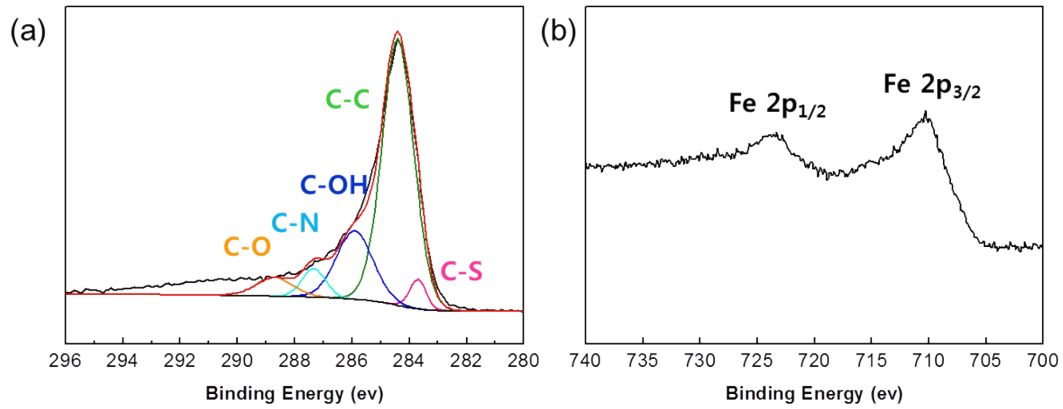

Fig. S3 XPS (a) C 1s and (b) Fe 2p spectra of edge activated S doped Fe-N-graphene

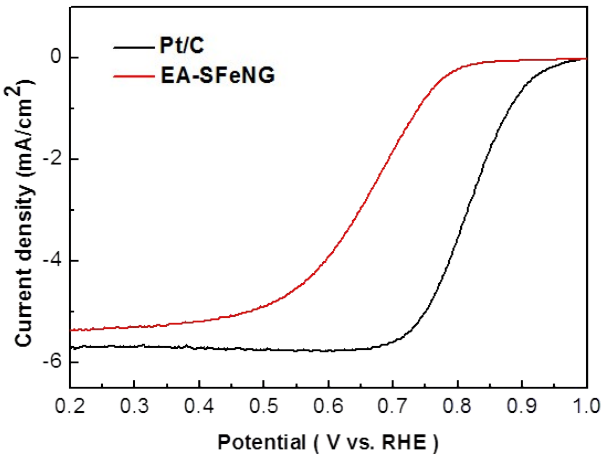

Fig. S4 RDE voltammograms of edge activated S doped Fe-N-graphene and commercial Pt/C (20%) catalyst in O_2 saturated 0.1M $HClO_4$ solution at a rotation speed of 1600 rpm and a scan rate of 5 mVs^{-1}

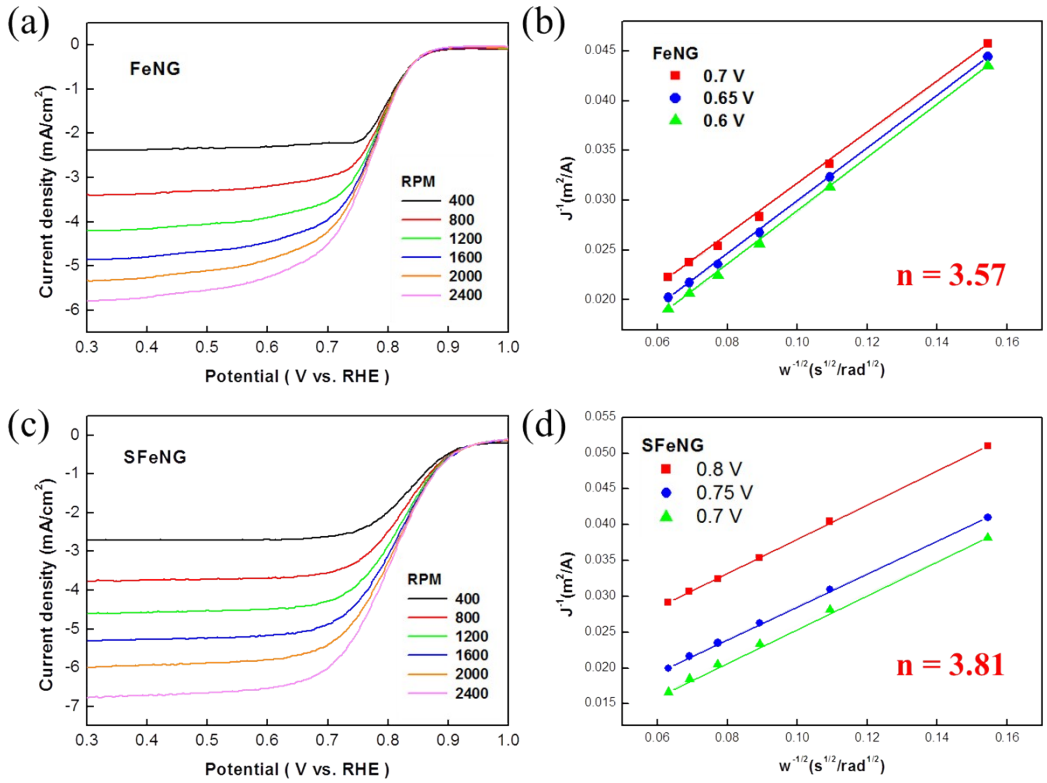

Fig. S5 RDE voltammograms of (a) Fe-N-graphene, (c) S doped Fe-N-graphene in O_2 saturated 0.1M KOH solution at different rotation rates and Koutecky–Levich plot of J^{-1} versus $w^{-1/2}$ of (b) Fe-N-graphene, (d) S doped Fe-N-graphene at different electrode potentials

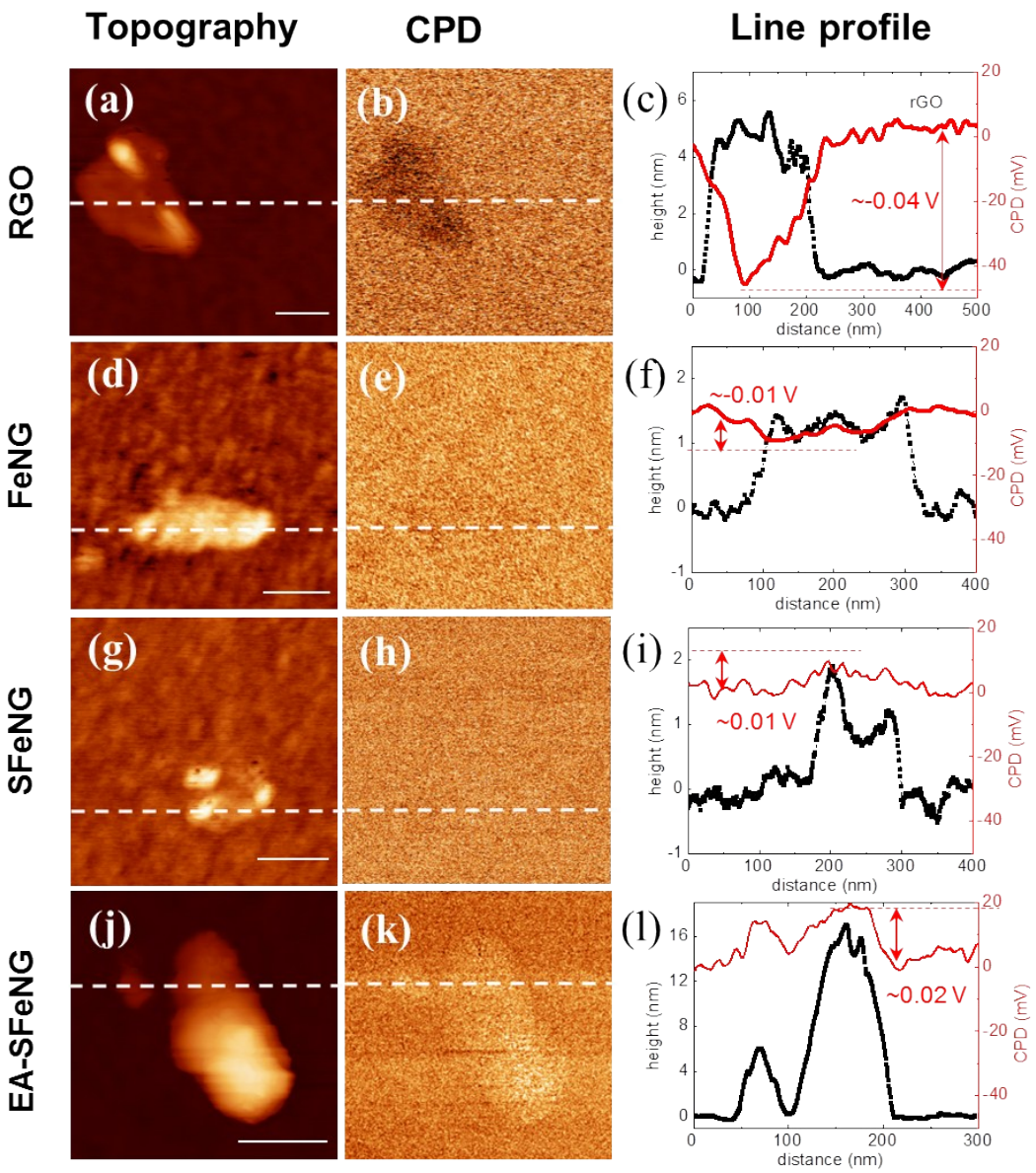

Fig. S6 For all graphene based catalysts, the height and CPD profiles along the white dashed lines are drawn as the black and the red lines, respectively. The CPD values between RGO and Si is roughly indicated in each figure.