Supporting Information

Direct Carbonization of Co-doped NH$_2$-MIL-53(Fe) for Electrocatalysis of Oxygen Evolution Reaction

Yujie Han$^{a,b}$, Junfeng Zhai$^a$, Lingling Zhang$^{a,b}$, and Shaojun Dong$^{a,b}$

$^a$State Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, Jilin, 130022 (China)

$^b$University of Chinese Academy of Sciences, Beijing, 100049 (China)

E-mail: dongsj@ciac.ac.cn
Figure S1 TEM images of (A) MOF(Fe$_3$-Co$_1$), (B) MOF(Fe$_1$-Co$_1$), and (C) MOF(Fe$_2$-Co$_3$) calcinated at 550 °C in N$_2$ atmosphere.

Figure S2 TEM images of (A) NH$_2$-MIL-53(Fe), (B) MOF(Fe$_3$-Co$_1$), (C) MOF(Fe$_1$-Co$_1$), and (D) MOF(Fe$_2$-Co$_3$).
Figure S3 XRD patterns of NH$_2$-MIL-53(Fe) (black line), NH$_2$-MIL-53(Fe$_3$Co$_1$) (red line), NH$_2$-MIL-53(Fe$_1$Co$_1$) (blue line), and NH$_2$-MIL-53(Fe$_1$Co$_3$) (green line).

Figure S4 BET measurements: (A) N$_2$ sorption isotherms and (B) BJH desorption pore size distributions of MOF(Fe$_1$Co$_3$) and MOF(Fe$_1$Co$_3$)$_{559\text{N}}$. 
Figure S5 Deconvoluted Ru 3d XPS spectra of as-prepared RuO$_2$ (A) and TEM image of as-prepared RuO$_2$. The deconvoluted peaks at 280.6, 282.5 and 284.3 eV are consistent with the peaks of Ru 3d$_{5/2}$, Ru 3d$_{5/2}$ sat and Ru 3d$_{3/2}$, respectively, which indicates the presence of Ru(IV). According to David J. Morgan$^{[1]}$, these binding energies suggest the formation of RuO$_2$.

Reference