Supporting information

**Figure S1** Low-magnification SEM image of the PPy modified carbon substrate.

**Figure S2** Low-magnification SEM image of the bare carbon substrate.
Figure S3 Fe2p core-level XPS spectra of Fe-PPy-C.

Figure S4 Ni2p core-level XPS spectra of Ni-PPy-C.
Figure S4 A 50 consecutive cycle scan of cyclic voltammogram of the Co-PPy-carbon material in corrosive iodide electrolyte at a scan rate of 100 mV s$^{-1}$. 