Fig. S1 the peak of deconvolution of S2p core level of S-GQDs-0.12 (a) and S-GQDs-0.63 (b).

In order to better evaluate the electrocatalytic activity of S-GQDs/R-GO samples, the electron transfer number was calculated by the Koutecky-Lecich equations (J s11, s12). This equation is evident for a first-order process with respect to the diffusion species.

Koutecky-Lecich equations:

$$\frac{1}{J} = \frac{1}{B\omega^{1/2}} + \frac{1}{J_k} \tag{1}$$

$$B = 0.2nF(D_{O2})^{2/3}v^{-1/6}C_{O2} \tag{2}$$

Here J is the current density, ωis the electrode rotating rate, n is the electron transfer numbers of S-GQDs/RGO samples in the ORR process, F is the Farady constant (F = 96485 C mol^{-1}), D_{O2} is the diffusion coefficient of O_2 in 0.1 M KOH ($D_{O2} = 1.9 \times 10^{-5}$ cm^2 s^{-1}), vis the kinematics viscosity for KOH (v= 0.01 cm^2 s^{-1}) and C_{O2} is concentration of O2 in the solution ($D_{O2} = 1.2 \times 10^{-6}$ mol cm^{-3}). 0.2 is employed when the rotation speed is noted in rpm. The K-L curves are drawn in inset of Fig. 3(b).
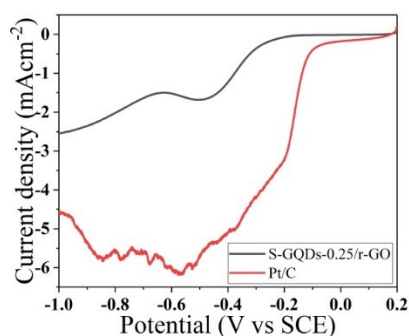

Fig. S2 The LSV of S-GQDs-0.25/r-GO and Pt/C at sweep rate of 5 Mv/s at 1600 rpm in O$_2$-saturated 0.1M KOH solution.