The oxygen reduction reaction has three main steps Breaking the O-O bond, which may be

Dissociative

$$^{!}O_{2} \rightarrow 2 O^{!} E1$$

Associatively dissociative

$${}^{!}O_{2} + H^{+} + e^{-} \rightarrow {}^{!}OOH$$
 E2.1.1

$$^{1}OOH \rightarrow ^{1}OH + O^{1}$$
 E2.1.2

Associatively reductive

$${}^{!}O_{2} + H^{+} + e^{-} \rightarrow {}^{!}OOH$$
 E2.2.1

$$^{!}OOH + H^{+} + e^{-} = H_{2}O(aq) + O^{!}$$
 E2.2.2

Conversion of O! to !OH

By electrochemical reduction

$$O^! + H^+ + e^- \rightarrow {}^!OH = E3.1$$

By Langmuir-Hinshelwood hydrolysis

$$O^! + H_2O^! \rightarrow {}^!OH + {}^!OH$$
 E3.2

Conversion of OH! to H₂O

$$^{!}OH + H^{^{+}} + e^{^{-}} \rightarrow H_{2}O$$
 E4