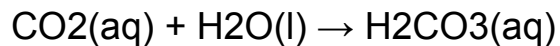
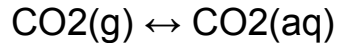


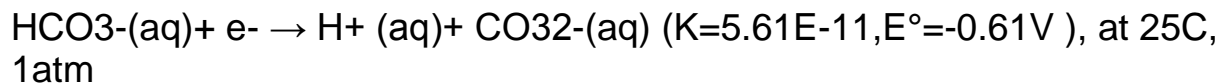
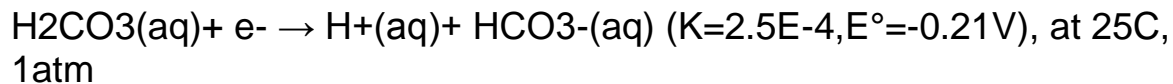
THE CO₂ CORROSION MECHANISM

CO₂ is naturally present in the ground, but it is also injected into wells as a method to increase oil recovery. The CO₂ reacts with ground water (H₂O), to produce carbonic acid (H₂CO₃):

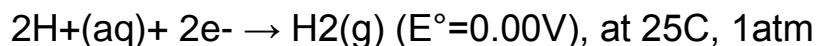


For the production of Carbonic Acid, the rate constant is $K=1.70\text{E-}3$ (at 25C, 1atm), so the reactants are favoured and only a small amount of CO₂ is converted into H₂CO₃.

Carbonic Acid (H₂CO₃), which is diprotic dissociates into Bicarbonate (HCO₃⁻) and then can dissociate into Carbonate (CO₃²⁻).

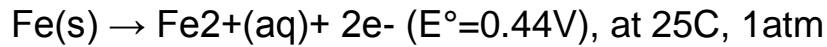


The third cathodic reaction also includes the reduction of hydrogen ions that are present in the ground water.

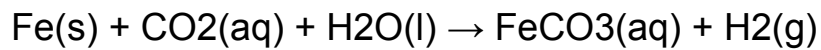


The selectivity of the cathode reaction is determined by certain environmental factors.

The anode reaction is the dissolution of iron metal at the pipe surface into iron ions.



The overall electrochemical reaction of CO₂ corrosion is given by,



Where FeCO₃ can further react to form a precipitate.

