

Corrosion Behavior of Carbon Steel in the CO₂ Absorption Process Using Potassium Serinate Solution

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The corrosion of carbon steel is occurred by reaction of CO₂ with chemical absorbent solution due to protonated amine dissociation, carbonate reversion, hydrolysis of CO₂, dissociation of water, dissociation of bicarbonate ion, formation of ferrous hydroxide and formation of ferrous carbonate.

The focus of this study is to investigate the possibility of corrosion in reaction of carbon dioxide with potassium serinate solution during carbon dioxide capture. We studied various conditions such as concentrations of potassium serinate and CO₂ loading as a function of temperature. Corrosion property of carbon steel in the CO₂ separation process was assessed by electrochemical measurements and weight loss method. The corrosiveness of potassium serinate solution can be explained on the basis of its polarization behavior and corrosion rate. A large increase in corrosion rate was observed with the increased concentration of Potassium Serinate in the absorption solution.