Experimental Study of Corrosion on A36 Mild Steel Towards Aqueous 2-Amino-2-Ethyl-1, 3-Propanediol and Diethanolamine

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Carbon dioxide (CO₂) absorption is a very promising approach to reduce CO₂ emissions from different industries especially power plants and then transport to injection sites. Then it passes through sequestration process for long-term storages that have a variety of suitable geologic formations. CO₂ absorption dealing with a wide range of amine solutions that are mostly used for this purpose. Additionally, most of the amine solutions are corrosive in nature, either they are lean or saturated with CO₂. In the present work, this corrosive behavior of 2- amino-2-ethyl-1, 3-propanediol (AEPD) and Diethanolamine (DEA) towards A36 mild steel have been investigated through the weight loss and electrochemical methods. The latest techniques like Field Emission Scanning Electron Microscopy (FESEM) and Energy-Dispersive X-ray (EDX) have been used for surface analysis of mild steel after corrosion test. Three different aqueous concentration of AEPD, DEA, and blended mixtures (0.3M, 0.6M, 0.9M) have been studied to determine the corrosion rate on mild steel. The effects of temperature and concentration on this process have been carried out by using electrochemical corrosion measurement techniques. The aqueous DEA with a concentration of 0.9M at 50°C resulted much higher corrosion rate (337.721×10^{-3} mm/year) compare to corrosion rate (35.867×10^{-3} mm/year) of 0.9M AEPD. The corrosion yield of a blended mixture of AEPD and DEA with 0.9M concentration was noted 119.115×10^{-3} mm/year.

Keywords: Corrosion rate; 2-amino-2-ethyl-1, 3-propanediol (AEPD); Diethanolamine (DEA); Mild steel; Amine;

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