Spontaneous inhibition phenomena of corrosion in CCUS system and their mechanisms

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Abstract: Carbon capture, utilization, and storage (CCUS) technology has been considered for reducing CO_2 emissions and improving energy efficiency. However, during the capture process, impurities such as O_2, SO_2, and NO_2 are present, which accelerate corrosion of transportation pipelines and wells. Nevertheless, researches also found several interesting corrosion inhibition phenomena in the system. In this study, we summarized the spontaneous corrosion inhibition phenomena during the capture, transportation process, and outlined the corresponding inhibition mechanisms. These include the corrosion inhibition mechanisms of the degradation products of organic amines, inhibition behavior of SO_2 on CO_2 corrosion processes. Additionally, this study also proposed several corrosion inhibition methods in CCUS system. Understanding these corrosion inhibition mechanisms is crucial for corrosion control of CCUS facilities.

Keywords: CCUS, Corrosion, Impurities, Inhibition mechanism

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