Study on the stability of reference electrodes for CP monitoring and the corrosion behavior of pipeline steel in saline-alkali soil

Hongxin Wang[1], Shaosong Chen[1]

Beijing Ankocorr Technology Co., Ltd., Beijing, 102209

Email:wanghx@ancorr.cn Tel:18240128650

Abstract: To clarify the long-term service stability of reference electrodes for CP monitoring and the corrosion behavior of buried pipelines in saline-alkali soil environments, this paper deeply investigates the real-time evolution of free corrosion potential, versus six different types of reference electrodes, of pipeline steel specimens through long-term exposure tests in saline-alkali soil collected from the field, and also studies the corrosion behavior of specimens after the exposure. The test procedures are proven efficient and desirable for selecting long-term reference electrodes suitable for purposes of CP and corrosion monitoring and assessment in saline-alkali soils, and further, of field data validation. Meanwhile, the corrosion rate of specimens are recorded with exposure time, and the correlation of the corrosion rate tendency with soil characteristics is also studied. The test results indicated that gel type copper sulfate reference electrodes were more suitable for saline-alkali soil environments than other candidates, and the corrosion rate of specimens in saline-alkali soils was significantly higher than that in ordinary soils. The results provide a solid theoretical basis and practical guidance for the corrosion protection management of pipelines in saline-alkali soil environments.

Keywords: Saline-alkali soil, Reference electrode, Long-term stability, Pipeline steel, Corrosion rate

Reference

[1] Guo Yong, Wang Yu,Ding Gifeng. Cause Analysis for Cathodic Protection Potential Coupons Corrosion Failure Behavior in Soil Environment[J]. Surface Technology,2022,51(10):235-240.

[2] Li Chunyu, Chen Zhuangnan, Qiao Boxiag. Failure mechanism and prevention of long-term reference electrode in Qaidam saline soil environment[J]. Corrosion & Protection, 2023,44(7):100-104.

[3] Brian S Wyatt Eur Ing, Bsc(Hons), CEng. Corrosion Cnotrol. 3 lvy Court, Acton Trussell, Staffordshire ST17 0SN.