

It was established that for the different study conditions, the temperature variable had a greater effect than the pressure on the variation of the quantities formed in thermodynamic equilibrium of the theoretical corrosion products. This research work becomes a point of reference for experimental studies where the effects of temperature and pressure variables are evaluated using carbon steels and that also allows validation of the results obtained in the simulation stage.

Acknowledgements

The authors acknowledge the support provided by the Universidad Industrial de Santander (UIS). Also, we thank the translator of this paper Heidy Gutiérrez at the School of Languages - UIS.

References

- Alviz A., Kafarov V., Meriño L., 2017. Methodology for evaluation of corrosion damage during combustion process in refinery and petrochemical industry. case study: AISI 304 and ASTM A335 P5 steels. *Chemical Engineering Transactions*, 61, 1315-1320.
- Bai H., Wang Y., Ma Y., Zhang Q., Zhang N., 2018. Effect of CO₂ partial pressure on the corrosion behavior of J55 carbon steel in 30 % crude oil/brine mixture. *Materials*, 11(9),1765.
- Nikitasari A., Royani A., Priyotomo G., Sundjono., 2021. The effect of flow rate and temperature on corrosion rate of carbon steel pipe in condensate solution from geothermal power plant. *Acta Metallurgica Slovaca*, 27(3), 133-138.
- Li S., Zeng Z., Harris M., Sánchez, L., Cong H., 2019. CO₂ corrosion of low carbon steel under the joint effects of time-temperature-salt concentration. *Frontiers in Materials*, 6, 10.
- Li S., Zhang K., Wang Q., 2019. Experimental study on the corrosion of a downhole string under flue gas injection conditions. *Energy Science and Engineering*, 7(6),2620-2632.
- Liu R., Zhang J., Meng L., Liu F., Zuo C., 2011. Feasibility study of steam/flue gas mixture injection in low permeability reservoir. *Society of Petroleum Engineers - Middle East Turbomachinery Symposium 2011, METS - 1st SPE Project and Facilities Challenges Conference at METS, Doha, Qatar, 13-16 February, 244–252.*
- Martín W., Gil S., Treto B., 2014. *Fundamentals of Corrosion and Metal Protection*. Magazine of the University of Cienfuegos "Carlos Rafael Rodríguez," (in Spanish).
- Moreno J., Santos L., Orozco J., Ariza, C., Muñoz S., Peña D., 2021. Determination of corrosion products for steam and flue gas injection environments in a Colombian field by using thermodynamic simulation with HSC Chemistry software. *Journal of Physics: Conference Series*, 1938, 012004.
- Pérez R., Rodríguez H., Barbosa C., Manrique E., Rendon G., 2020. SPE-199104-MS Improving CSS Performance with Preformed Foam: Teca - Cocorna Field location. SPE Latin American and Caribbean Petroleum Engineering Conference, Online conference, <<https://www.spe.org/events/en/2020/conference/19laccp/home.html> > accessed 20.05.2022, 27-31 July.
- Pérez R., Sandoval J., Barbosa C., Delgadillo C., Trujillo M., Osma L., 2018. Comparison of alternatives for improving cyclic steam injection by numerical simulation. *El Reventón Energetico*, 16, 91–108 (in Spanish).
- Sui P., Sun J., Hua Y., Liu H., Zhou M., Zhang Y., Liu J., Wang Y., 2018. Effect of temperature and pressure on corrosion behavior of X65 carbon steel in water-saturated CO₂ transport environments mixed with H₂S. *International Journal of Greenhouse Gas Control*, 73, 60–69.
- Villaquirán A.P., Rodríguez A.X., Muñoz S.F., 2017. Evaluation of the influence of flue gas in continuous steam injection processes using downstream steam generators, *Revista ION*, 30(2), 65–77 (in Spanish).
- Xiang Y., Wang Z., Li Z., Ni D., 2013. Effect of temperature on corrosion behaviour of X70 steel in high pressure CO₂/SO₂/O₂/H₂O environments. *Corrosion Engineering Science and Technology*, 48(2), 121–129.
- Wang Z., Song G., Zhang, J., 2019, Corrosion Control in CO₂ Enhanced Oil Recovery From a Perspective of Multiphase Fluids. *Frontiers in Materials*, 6, 272.