World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:16, No:10, 2022

Impact of Gases Derived from Sargassum Algae Biodegradation on Copper Atmospheric Corrosion

Authors : M. Said Ahmed, M. Lebrini, J. Pellé, S. Rioual, B. Lescop, C. Roos

Abstract : The corrosion behavior of copper exposed in a marine atmosphere polluted and unpolluted by gases, mainly hydrogen sulphide (H2S), from the decomposition of Sargassum algae was studied using the mass loss method and electrochemical measurements. MEB/EDX and XRD were also used for the observation of morphology and surface analysis. To study the impact of this on copper corrosion, four sites more or less impacted by Sargassum algae strandings were selected. The samples were exposed for up to six months. The mass loss results showed that the average corrosion rate of copper was 528 µm/year for the site most affected by Sargassum algae and 9.4 µm/year for the least impacted site after three months of exposure, implying that the presence of Sargassum algae caused an important copper degradation. The morphological structures and properties of the corrosion products obtained at the impacted and non-impacted sites differed significantly. In the absence of Sargassum algae, we obtained mainly Cu2O and Cu2Cl(OH)3. Whereas in the atmosphere with Sargassum algae, CuS product is the main corrosion product obtained. Electrochemical analyses showed that the protection offered by the corrosion product layer was more important and improved with time for the non-impacted sites, whereas on the impacted sites, this protection deteriorated.

Keywords : atmospheric-corrosion, sargassum algae, copper, electrochemical techniques, SEM/EDX and XRD
Conference Title : ICCE 2022 : International Conference on Corrosion Engineering
Conference Location : Barcelona, Spain
Conference Dates : October 20-21, 2022