

ACCELERATED ELECTROCHEMICAL METHOD FOR STUDYING THE CORROSION BEHAVIOR OF AISI321 STAINLESS STEEL FOOD GRADE IN ACIDIC FOOD ENVIRONMENTS

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Abstract

The purpose of this research was to study by electrochemical methods the behavior of AISI321 stainless steel food grade samples in acidic corrosive environments. 3%, 6% and 9% CH₃COOH solutions in bidistilled water were used. The volume of solution studied was 300 ml. The exposure time of the stainless steel samples was 90 min. and the exposure temperature was 22±1°C. In order to achieve the proposed objective was been used a complex system consisting of a potentiostat-galvanostat Wenking (HP 96-20), two multimeters Hameg (HM 8112-3) for voltage monitoring, an original electrochemical cell and a computer for programming, acquisition and interpretation of experimental data. In order to develop the mass balance the theoretical masses of ⁵⁶Fe, Mn, Cr, Ni and Ti metal ions which migrated in corrosive solutions were calculated. The chemical analysis of corrosive solutions after migration tests was performed by ICP-MS method. The dissolution rates of metal ions studied were calculated. The results obtained demonstrate the validity of the accelerated electrochemical method in laboratory tests for the study of the migration phenomena of metal ions in acidic food environments.

Key words: stainless steel, electrochemical cell, migration, mass balance, dissolution rate
