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MODELING OF OXIDATION KINETICS IN AIR OF STEEL-T21 ALLOY COATED BY SIMULTANEOUS GERMANIUM-DOPED ALUMINIZING-SILICONIZING PROCESS BY MULTIPLE LINEAR REGRESSION USING MATLAB

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Abstract

This work includes the application of a pack cementation of germanium-doped aluminum and silicon coatings on low alloy steel type-T21 yields a significant improvement in the oxidation. Steel-T21 was coated with germanium-doped aluminzing-siliconizing. Diffusion coating was carried out at 1050 ^{o}C for 6 h under an Ar atmosphere by simultaneous germanium-dopded aluminizing-siliconizing process. Cyclic oxidation tests were conducted on the coated steel-T21 alloy in the temperature range oxide 300-900 ^{o}C in air for 102 h at 3 h cycle. The results showed that the oxidation kinetics for coated system in air was found to be parabolic .Oxide phases that formed on coated system are SiO_2 and Al_2O_3. Mathematical model using MATLAB show that there is multiple linear model for oxidation kinetics.

Keywords: Steel-T21; Oxidation; Aluminizing-Siliconizing; Pack cementation