

COMPARATIVE ANALYSIS OF BEHAVIOR OF OXIDATION FERRITIC STAINLESS STEEL AISI 439 IN HIGH TEMPERATURES IN ATMOSPHERES ARGON AND AIR SYNTHETIC

Maria Fatima Salgado^{1,2}, Joao Alberto Santos Porto^{1,2}, Giscard Eanes^{1,2}, Olandir Vercino Correa³, Lalgudi Venkataraman Ramanathan³, Ayrton de Sá Brandim¹

¹Instituto Federal de Educação, Ciência E Tecnologia do Piauí, ²CENTRO DE ESTUDOS SUPERIORES DE CAXIAS DA UNIVERSIDADE ESTADUAL DO MARANHÃO, ³Instituto de Pesquisas Energéticas e Nucleares

e-mail: mariadefatimasalgado@yahoo.com.br

Stainless steels able to use in atmosphere with gases at high temperatures oxidize to form a protective oxide film or not on steel. This study deals with the growth kinetics of research and composition of the formed oxide films on stainless steel AISI 439 ferritic between 850 ° C and 950 ° C temperatures in synthetic air atmosphere containing 0.5% O₂ and argon (1 ppm) O₂. Samples were oxidized on a thermobalance for 50h. The oxidation kinetics was established by measuring the mass gain per unit area vs oxidation time. The microstructure and chemical composition of the oxides were analyzed by scanning electron microscopy, energy dispersive spectroscopy EDS. Regarding the microstructure was observed a thin, adherent film to the substrate for the two atmospheres. Chemical analysis discloses that chromium is the main component of the film formed on the steel, synthetic air atmosphere to a temperature of 850 ° C was observed sand rose. The oxidation kinetics shows a behavior with increasing temperature, according to a parabolic law, according to Wagner's theory, indicating a ionic diffusion process.