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Carbon diffusion in 304l austenitic stainless steel at 650 steel at 650 -750°c in carburizing environment (Article)

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Abstract

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A 304L austenitic stainless steel is widely used in the petrochemical industry. As it is exposed to carburizing environment, carbon diffuses into metal and form carbides. Effect of the environment on the carbon diffusion is interesting to be known. This study will evaluate the effect of CH_4/H_2 gas concentration and carburizing temperature on carbon diffusion in 304L austenitic stainless steel . Horizontal furnace equipped with a quartz tube and vacuum pump was used to expose the samples to carburizing environment at 650°C - 750°C and 20% - 40% CH_4/H_2 gas composition for 100 hours. Optical microscopy examination of cross-sectioned specimens of 304L stainless steel showed that no carburizing zone formed after the samples subjected to 20% CH_4/H_2 gas composition at 650˚C. It is observed that low carbon deposited on substrates with an average 0.0011g and carbon activity, ac, equal to 0.31. In comparison, with 40% CH_4/H_2 gas composition at 650˚C, the average carbon deposited on the surface was two times more and carbon activity increased more than one, known as carburizing zone. Carbon diffusion at 750°C was deeper than at 650°C for both CH_4/H_2 gas concentrations 20% - 40%. In conclusion the depth of the carburization zone increases with increasing the temperature from 650˚C to 750˚C and increases with increasing percentage of CH4/H2 gas composition. © BEIESP.

SciVal Topic Prominence

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