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Evaluation of Oxide Formation on Heat-Treated Pure Titanium

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**Abstract:**

The heat treatment of titanium and its alloy after a machining operation is a very common practice among most manufacturer, its main purpose is to relieve stress that build-up in the material and also to increase the toughness of the final component prior to its installation. In this paper, the pure titanium grade 2 was heat-treated at two different temperatures: 700 and 900°C. The oxidation behaviour at the top and sub-surface of the sample was initially evaluated through a microscope and subsequently through a scanning electron microscope (SEM). The chemical composition was evaluated through EDX analysis. In addition, the variation in hardness and weight gain were also assessed. It was found that the heat treatment at 700 °C that is below the phase transition temperature for titanium grade 2 triggered a noticeable softening effect and the formation of a greyish layer of oxide was formed whereas, at 900 °C, a light brownish layer of oxide was deposited on the surface and the material hardness was more significant.