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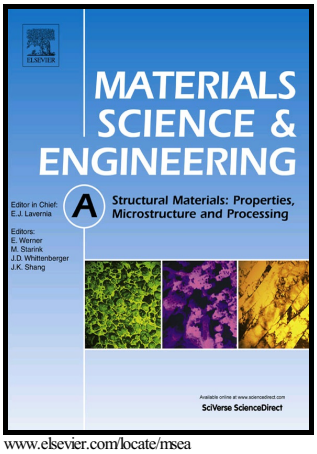

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Thermo Hydrogen Treatment for Microstructure Refinement and Mechanical Properties Improvement of Ti-6Al-4V Alloy

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Abstract

Cast titanium alloys are of great importance in industry, but their mechanical properties are under satisfaction and difficult to improve. Thermo hydrogen treatment (THT) offers a method for the microstructural refinement of titanium alloys without deformation, and thus attracts the attention of researchers. In this work, THT is performed on cast Ti-6Al-4V alloy, including hydrogenation, solution-aging treatment and dehydrogenation. The microstructure evolution during the THT process is carefully studied, and the role of each step for microstructure refinement is carefully evaluated, leading to the conclusion that the solution-aging treatment is the most important step for refinement. Tensile properties of the samples treated with THT were obtained, showing that the THT can increase the tensile strength of the as-cast alloy by ~27.44%.

Keywords: Titanium alloy; Hydrogen; Microstructure; Tensile property

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