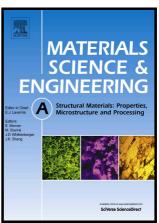
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Thermo Hydrogen Treatment for Microstructure Refinement and Mechanical

Properties Improvement of Ti-6AI-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

allov by ~27.44%.

Keywords: Titanium alloy; Hydrogen; Microstructure; Tensile property

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