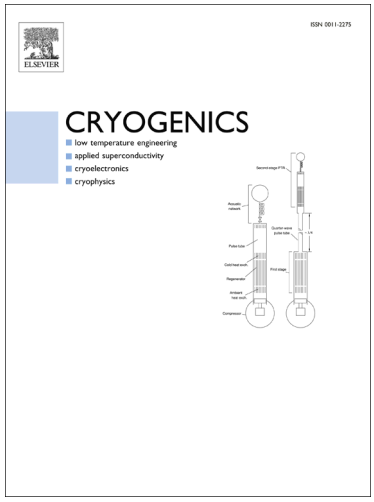

Cryogenic Mechanical Behavior of 5000- and 6000-Series Aluminum Alloys: Issues on Application to Offshore Plants

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Cryogenic Mechanical Behavior of 5000- and 6000-Series Aluminum Alloys: Issues on Application to Offshore Plants

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Abstract

The mechanical behavior of aluminum alloys was investigated in terms of four aspects: temperature, strain rate, material type, and fracture shape. The candidate materials were 5000- and 6000-series alloys. The material characteristics were investigated and summarized as a function of low temperature (110–293 K) and quasi-static strain rate (10^{-4} and 10^{-2} s^{-1}). The results confirmed that the strength and ductility of aluminum alloys improved with a decrease in the temperature. The aluminum alloys showed a strain rate effect only in terms of the ductility of the 5000-series alloys. In addition, fractography analyses were performed on the fracture specimens to explain the material behavior at cryogenic temperatures.