

## PROCEEDINGS

# Simple but Effective Heat Treatment on Hot Isostatic Press Diffusion Bonded Ni60A Hardfacing Layer

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## ABSTRACT

Ni60A hardfacing alloy, as one of the highest-alloy grades and hardest alloy of Ni-Cr-B-Si alloys, is expected to be used as hardfacing alloy for thrust discs in nuclear main pumps to reduce friction, corrosion and erosion. Since mechanical properties of Ni-Cr-B-Si alloys are very sensitive to their defects and microstructures, heat treatment/remelting methods have been used to eliminate porosity and to modify microstructural heterogeneity. In our previous research, Ni60A hardfacing layer with high micro-hardness and excellent bonding strength has been fabricated onto 0Cr18Ni10Ti austenitic stainless steel using hot isostatic press diffusion bonding technique. However, some small pores and obvious microstructural heterogeneity were observed in the hardfacing layer. Therefore, according to differential scanning calorimetry and in-situ high-temperature laser-scanning confocal microscopy results of the Ni60A hardfacing alloy, a simple (1000 Celsius, holding 30 min, Air cooling) heat treatment was selected in this study to resolve the above-mentioned issues. The results show significant modification on the microstructure after heat treatment, with lower porosity and more homogeneous microstructure. Meanwhile, room-temperature mechanical and electrochemical results were also show to be more advantageous compared to those in literatures. These demonstrate the validity of the simple heat treatment, which can be used to overcome the issues of porosity and microstructural heterogeneity of the Ni60A hardfacing layer.

## KEYWORDS

Ni60A hardfacing layer; heat treatment; homogeneous microstructure; room-temperature properties

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present study.