

# **Corrosion Properties Of Inconel 617 Alloy After Heat Treatment At Elevated Temperature**

**Kewther, A; Yilbas, BS; Hashmi, MSJ**

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King Fahd University of Petroleum & Minerals

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## **Summary**

Inconel alloys find wide application in industry as high-temperature resistance materials. In the present study, refurbishment of the Inconel 617 alloy after 37,000 h of operation in the field is carried out through the heat-treatment process. The electrochemical response of the heat-treated alloy is determined through potentiodynamic testing of the surfaces. The heat-treatment process is carried out at 1175 degreesC for 1 and 2 h in an air free furnace. The corrosion rate is estimated from TAFEL and polarization measurements. The surface morphology after the electrochemical tests is studied using scanning electron microscopy (SEM), while the material characterization at the surface is carried out using energy disperse spectroscopy (EDS), It is found that the corrosion resistance improves considerably for the workpieces subjected to 1 h heat treatment. The depletion of Cr and Mo at grain boundaries results in excessive pitting in this region. Moreover, enrichment of Cr at the surface after 1 h heat treatment reduces the corrosion current.

## **References:**

1. CHAVEZ SA, 1994, NUCL ENG DES, V148, P351
2. COOPER KP, 1996, MAT SCI ENG A-STRUCT, V206, P138
3. GONZALEZRODRIGUEZ JG, 1998, MATER CHEM PHYS, V56, P70
4. HIROSE A, 1998, INT J MATER PROD TEC, V13, P28
5. HO JT, 1992, CORROSION, V48, P147
6. KEWThERALI M, 1999, P INT C ADV MAT PROC, P963
7. KOMAZAKI S, 1997, T JAPAN SOC MECH ENG, V63, P1481

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<http://www.kfupm.edu.sa>

8. PANDEY MC, 1996, B MATER SCI, V19, P1009
9. SWAMINATHAN VP, 1992, P INT GAS TURB AER C
10. VENKATESH V, 1998, MECH MATER, V30, P69

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