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Costão do Santinho
Florianópolis-SC

MmeCo04-001 - Laser Remelting for the Surface Recovery of Austenitic Stainless-Steel Welds Affected by Chromium Carbide Precipitation

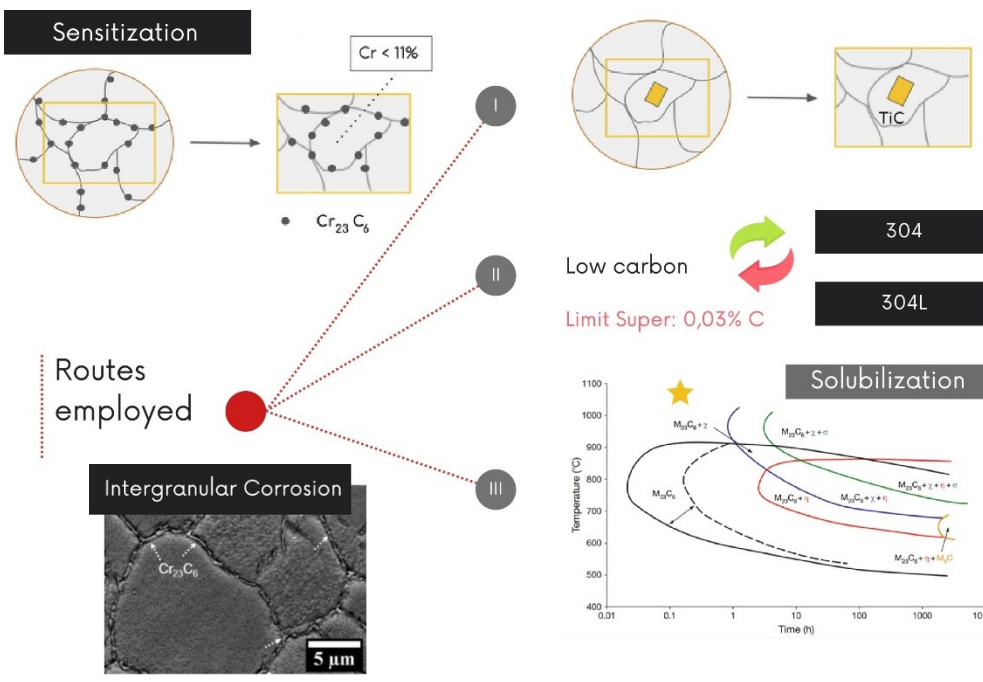
Ana L. S. Cruz[a,*], Caio L. G. P. Martins[a], Lucas Otani[a], Piter Gargarella[a], Guilherme Y. Koga[a]

[a] *Federal University of São Carlos, Graduate Program in Materials Science and Engineering, , São Carlos, Brazil*

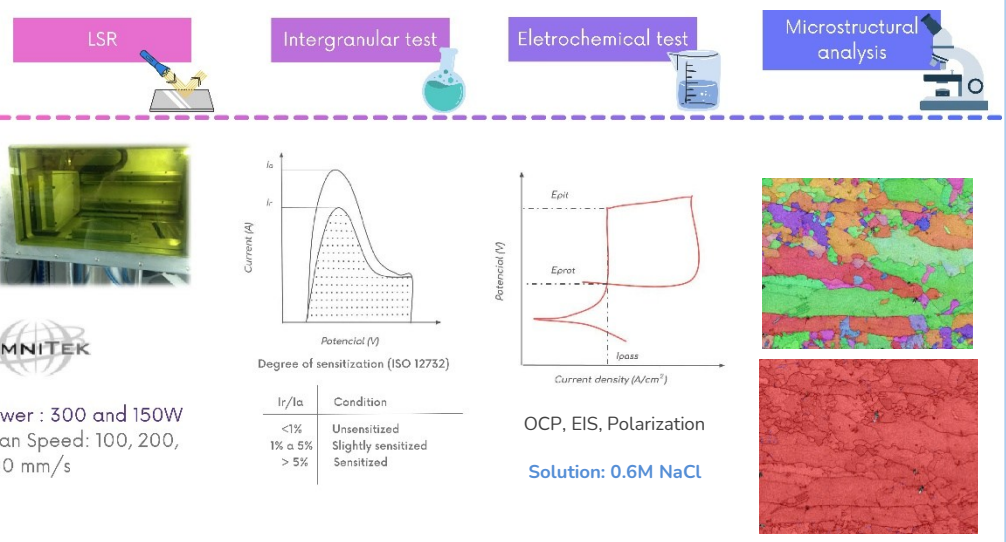
e-mail: ana.cruz@estudante.ufscar.br



Introdução / Introduction



Metodologia / Metodology



Resultados/ Results

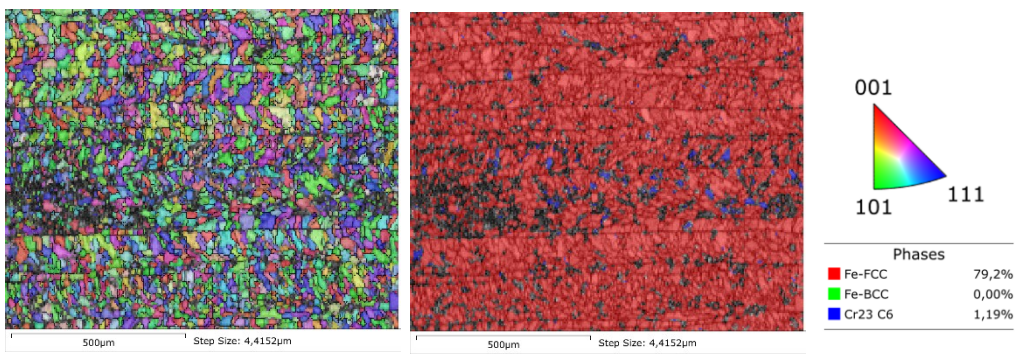


Figure 1. EBSD inverse pole figure (IPF) orientation map and corresponding phase distribution map of the AISI 304 weld after laser surface remelting (LSR) at an energy density of 2000 J/cm² and a laser power of 300 W.

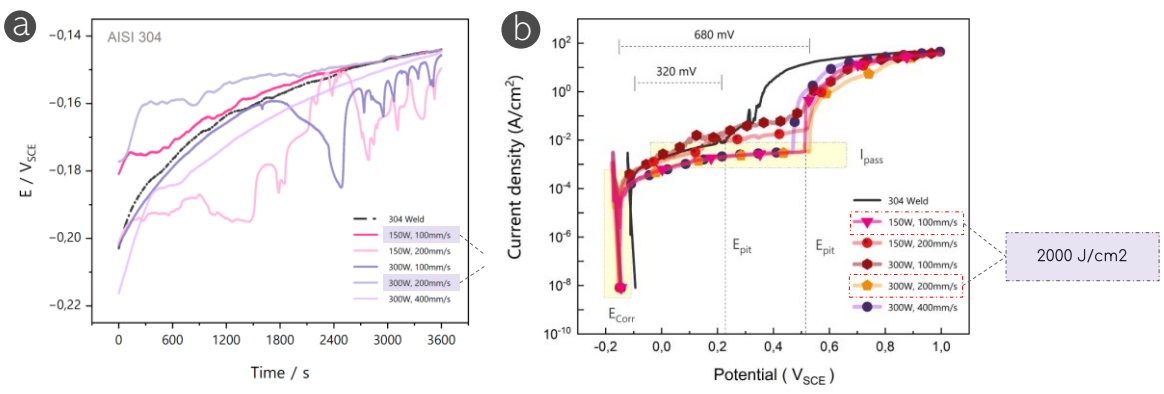


Figure 2. (a) Open-circuit potential (OCP) evolution and (b) potentiodynamic polarization curves of the as-received AISI 304 weld and its laser-remelted conditions using laser powers of 150 and 300 W. Test performed in 0.6M NaCl.

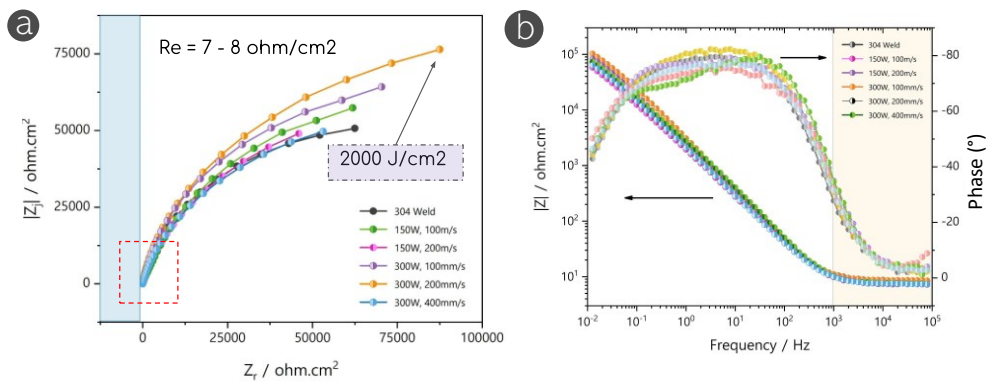
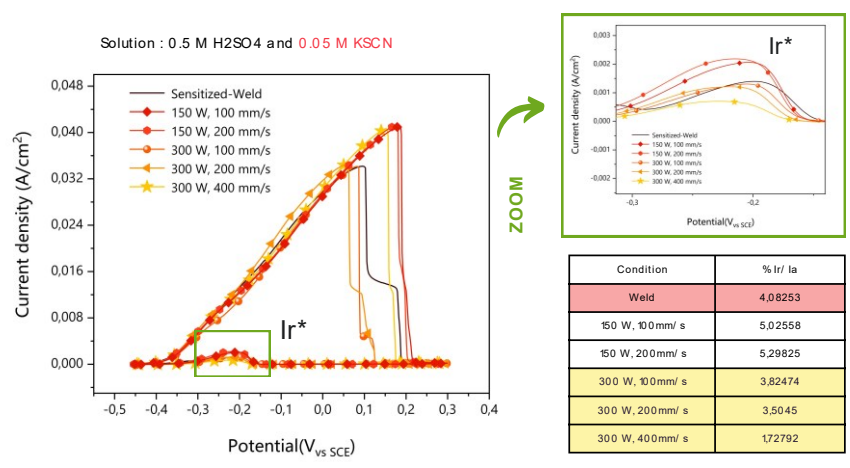
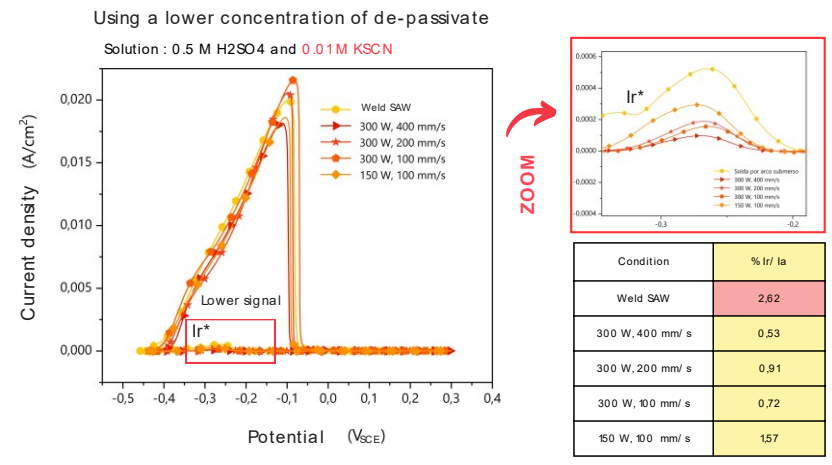


Figure 3. EIS performed in 0.6M NaCl. (a) Nyquist diagram and (b) Bode curves of the as-received AISI 304 weld and its laser-remelted conditions.

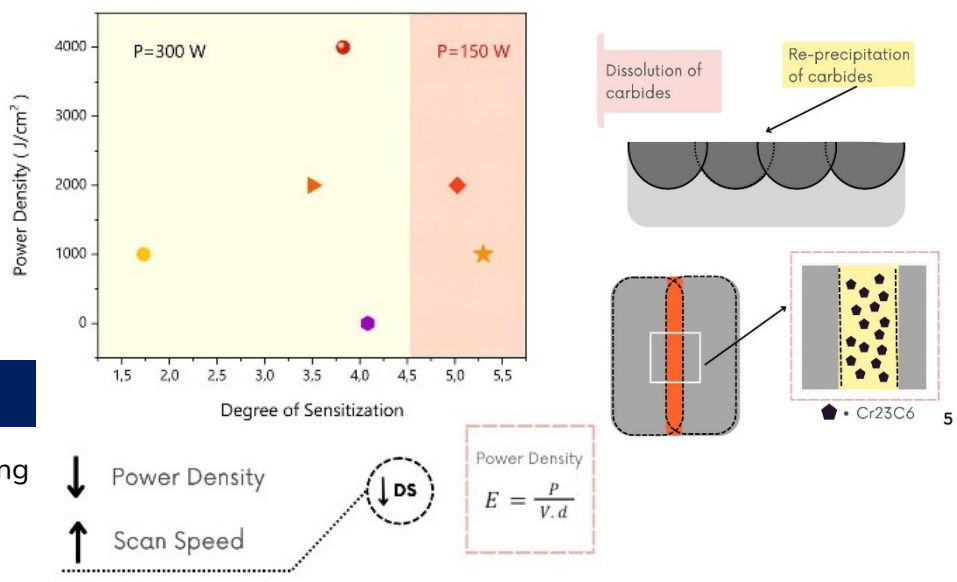


Condition	% Ir/ Ia
Weld	4,08253
150 W, 100mm/ s	5,02558
150 W, 200mm/ s	5,29825
300 W, 100mm/ s	3,82474
300 W, 200mm/ s	3,5045
300 W, 400mm/ s	1,72792



Condition	% Ir/ Ia
Weld SAW	2,62
300 W, 400 mm/ s	0,53
300 W, 200 mm/ s	0,91
300 W, 100 mm/ s	0,72
150 W, 100 mm/ s	1,57

Figure 4. Dual loop curve indicating the degree of sensitization for a weld by submerged arc welding (SAW) before and after LSR with different powers and scan speeds employed with different de-passivate concentration.



Conclusão / Conclusion

- Laser surface remelting (LSR) proved to be an effective approach for restoring the corrosion resistance of sensitized surfaces, particularly welded regions.
- Among the conditions investigated, higher energy densities promoted more effective recovery of the material's corrosion performance.

Acknowledgments / Agradecimentos