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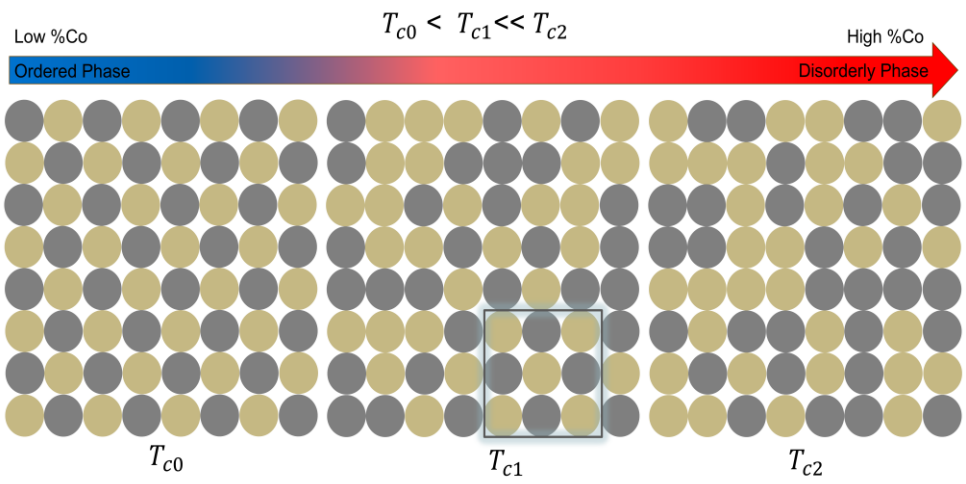
Cobalt addition in Ni-Cr-based alloys as a method to suppress ordered phase formation

Vinícius Pereira Bacurau [1,2], Gabriela Bugni Ribeiro [1,2], Guilherme Zuzullo [1], Eric Marchezini Mazzer [1,2], Francisco Gil Coury [1,2]

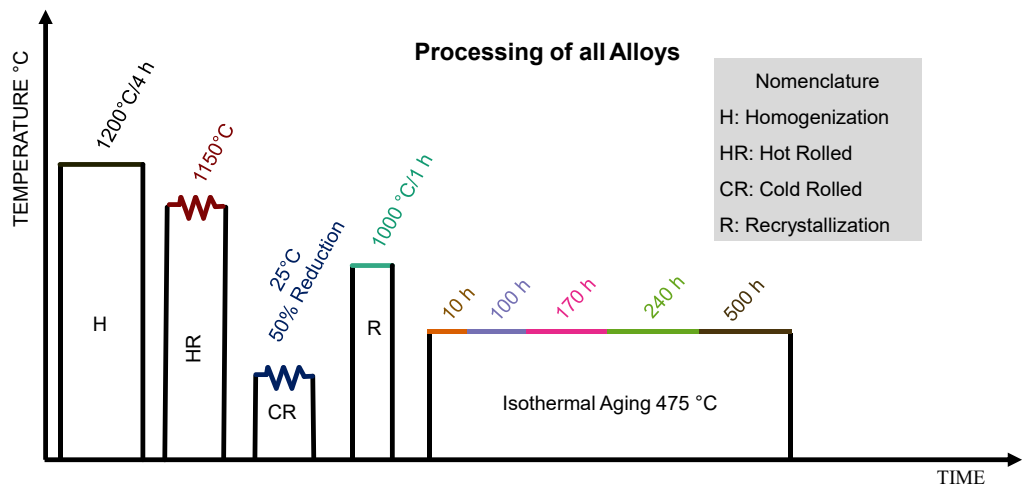
[1] Federal University of São Carlos, Graduate Program in Materials Science and Engineering.
[2] Federal University of São Carlos, Department of Materials Science and Engineering.

Email: vinicius.bacurau@estudante.ufscar

Introduction



Methodology



Results

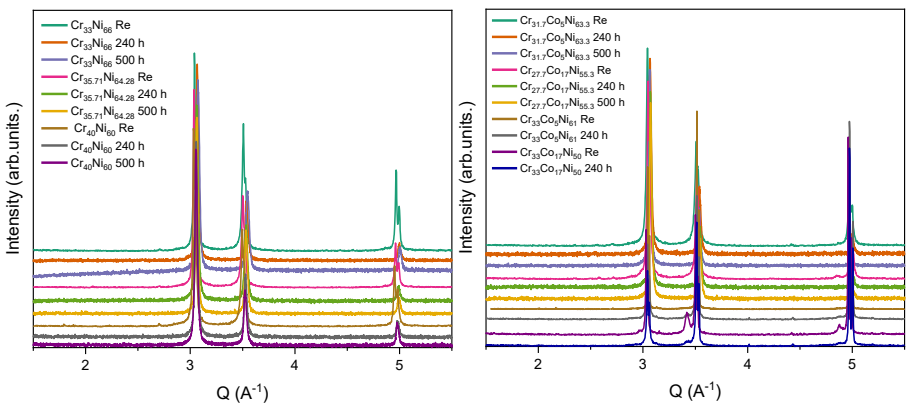


Fig. 1. XRD patterns of a) binary and b) ternary samples. Only peaks corresponding to the FCC phase are observed.

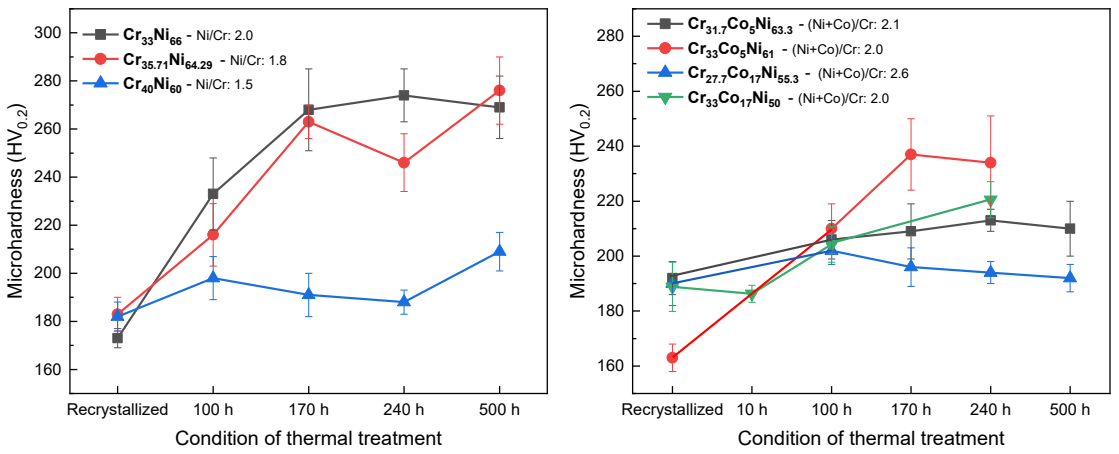


Fig. 2. Hardness of the samples under different heat treatment conditions. It can be observed that, for some compositions, longer aging times lead to an increase in hardness.

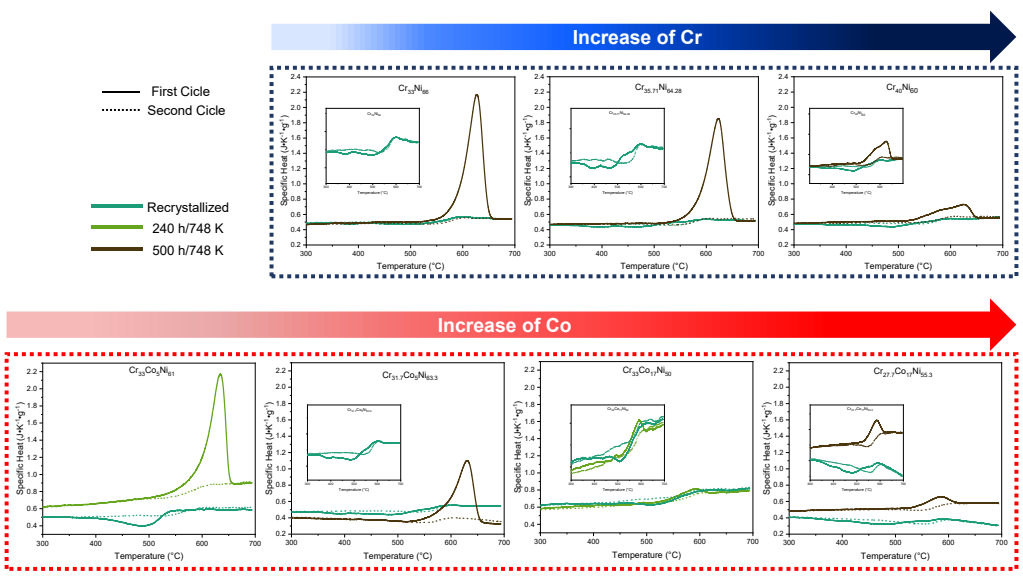


Fig. 3. Specific heat results for all samples under different heat treatment conditions. The lower right corner presents the dissolution and formation energies, obtained from the DSC curves at the endothermic and exothermic peaks, respectively.

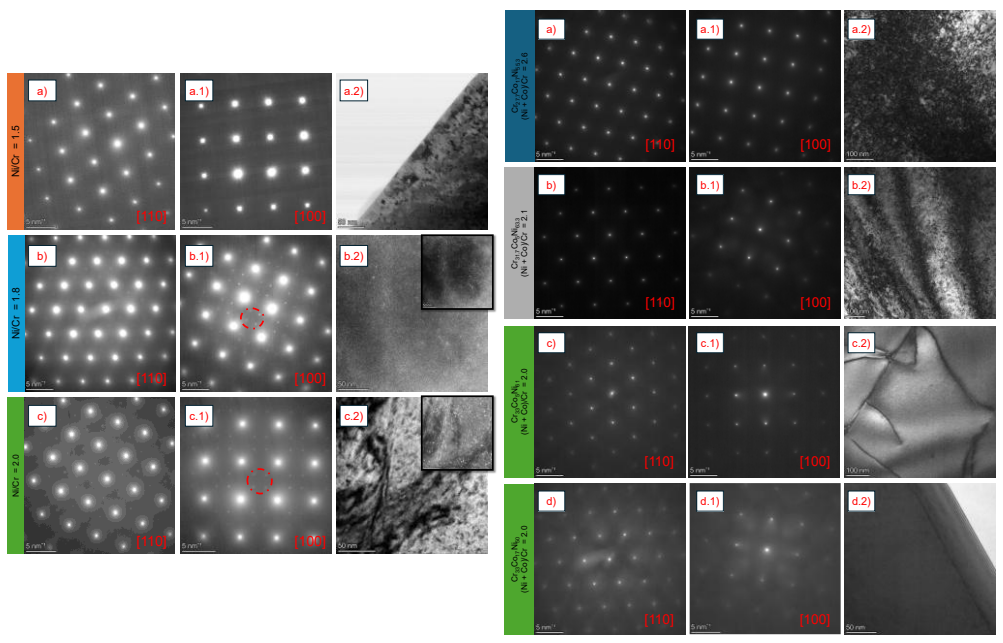


Fig. 4. Transmission electron microscopy (TEM) results for all compositions in the condition subjected to the longest aging treatment.

Conclusions

- In the Cr-Ni alloys, increasing deviations from the Ni/Cr stoichiometric ratio of 2.0 progressively suppress the precipitation kinetics of the ordered Ni_2Cr phase.

- In the ternary alloys, a stoichiometric ratio of 2.0 leads to more pronounced changes in mechanical properties and higher dissolution energies, with endothermic reactions observed under the longest aging conditions.

- Among the ternary alloys with a stoichiometric ratio of 2.0, lower Co contents result in greater changes in mechanical properties. However, no ordered phase was detected in any ternary alloy, suggesting that Co suppresses the formation of the Ni_2Cr phase.

Acknowledgements

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