



Research Article

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Structural inhomogeneity of metallic materials and quality criteria

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Keywords:

Metallic materials, Structural inhomogeneity, Material quality, Microstructural features, Mechanical properties, Grain size variation, Defects, Quality standards, Material performance

Abstract:

The object of research is the structural inhomogeneity of metallic materials and its relationship with established quality criteria. The study focuses on the impact of microstructural variations, such as grain size distribution, defect presence, and phase heterogeneity, on the mechanical and physical properties of metals. **Method.** A combination of advanced microscopy techniques, statistical analysis of microstructural features, and standardized mechanical testing is employed to quantify structural inhomogeneity. Correlations between structural characteristics and quality indicators, such as strength, ductility, and durability, are established using regression models and quality standards. **Results.** The findings reveal that increased structural inhomogeneity negatively affects key quality parameters, including mechanical stability and material performance. Specific thresholds of inhomogeneity are identified, beyond which materials fail to meet quality standards. The study provides a framework for predicting material performance based on microstructural assessment and suggests pathways for improving quality through optimized processing techniques.

1 Introduction

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2 Materials and Methods

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3 Results and Discussion

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4 Conclusions

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5 Acknowledgements

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6 Fundings

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7 Conflict of Interests

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References

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