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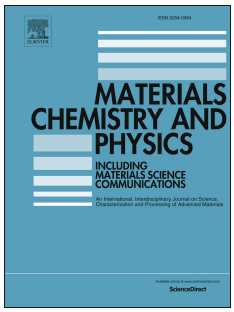

Microstructural Features and Dry - Sliding Wear Response of MoTaNbZrTi High Entropy Alloy

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Microstructural Features and Dry - Sliding Wear Response of MoTaNbZrTi High Entropy Alloy

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Abstract

In this work, the microstructure, mechanical properties and dry-sliding wear response of MoTaNbZrTi refractory high-entropy alloy were evaluated. The alloy was prepared by vacuum arc melting and its phase formation prediction models were verified in terms of the actual presented microstructural features. Two crystal lattices were identified by X-ray analysis, while a characteristic dendritic morphology was spotted. The alloy's micro and macro hardness took elevated values, while its compression properties were also examined. The alloy's dry-sliding wear response was tested under different experimental conditions (e.g. sliding distances and counter body materials). In all cases, the possible wear mechanisms were suggested with respect to volume loss, wear rate and friction coefficient estimations. The worn surfaces and debris were also examined by SEM/EDS analysis. Finally, a preliminary wear response comparison between the presented system and two other high entropy alloys proved the supremacy of MoTaNbZrTi regarding its tribological behavior.

Keywords: High Entropy Alloys; Microstructure; Mechanical properties; Tribological properties