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Synthesis Using Sintering and Characterisation of FeCrCoNiZn Alloy Using SEM and Nanoindentation

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Abstract : This paper reports on the synthesis of FeCrCoNiZn and its characterisation using SEM and nanoindentation. The high entropy alloy FeCrCoNiZn was fabricated using spark plasma sintering at a temperature of 1100°C from powders mixed for 9 hours. The powders mixture was equimolar, and the resultant microstructure had a single crystalline structure when studied under SEM. Several nano Vickers hardness measurements were taken on a polished surface etched by Nital solution. The hardness ranged from 711 Vickers to a maximum of 1773.2. The alloy FeCrCoNiZn showed a nano hardness of 1070 Vickers and a modulus of elasticity of 460.4 MPa. The process managed to fabricate a very hard material that can find applications where wear resistance is desired.

Keywords : high entropy alloy, FeCrVNiZn, nanohardness, SEM
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