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Effect of gas protection on form and microstructure of wire arc additive  
manufactured WE43 magnesium alloy

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In this study, WE43 magnesium alloy was successfully fabricated using wire arc additive manufacturing technology, focusing on reducing the common oxide inclusion defects. The implementation of a gas shielding hood significantly improved the grain morphology of the deposited samples and diminished both the quantity and size of oxides. In addition, the cooling effect induced by the shielding gas contributed to the refinement of grain size. The synergistic effect of oxide reduction and grain refinement significantly improves the mechanical properties of the deposited samples. For heat-treatable magnesium alloys, minimizing the consumption of rare earth elements is beneficial for optimizing heat treatment mechanical properties.