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Biodegradable Mg-rich metallic glasses for potential skeletal application in the Ca-Mg-Zn system

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Abstract

Magnesium alloys, are a new promising degradable and compatible biomaterials that have recently attracted great attention. The major advantages of magnesium alloys are their good mechanical properties, biodegradability and biocompatibility. As a biodegradable metallic implants, these alloys can be designed to stabilize a structure by allowing bone to grow while simultaneously dissolving harmlessly in the body and thereby reducing the burden of additional surgical interventions. In the present research, the Mg-rich metallic glasses in the Ca-Mg-Zn system were firstly prepared and characterized by differential scanning calorimetry and X-ray diffraction. The feasibility of these materials as biodegradable implants was then evaluated using mechanical and corrosion tests. The microstructures before and after corrosion tests were studied in the simulated body fluid. The Mg-based metallic glass with high Zn content presents a more uniform corrosion morphology and enables a greater corrosion resistant compared to low Zn content glasses and to crystalline Mg.