THE EFFECT OF CALCIUM ON THE HARDNESS, CORROSION BEHAVIOR AND MICROSTRUCTURE OF BIOABSORBABLE MAGNESIUM-ZINC ALLOYS

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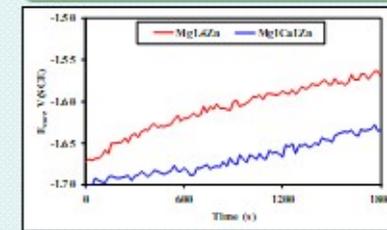
OBJECTIVE

The microstructure, hardness and corrosion behavior of bioabsorbable magnesium-zinc alloys (Mg1.4Zn and Mg1Ca1Zn) in Ringer solution were examined because magnesium has mechanical qualities, controlled degradation rate and biocompatibility, making it appropriate for temporary fixation devices and preventing the need for a second surgery.

METALLOGRAPHY TEST

Mg1.4Zn

Mg1Ca1Zn
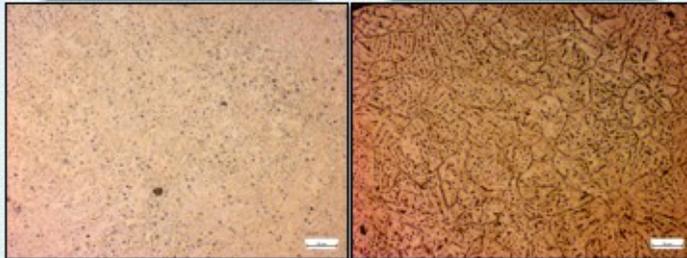
MICROHARDNESS TEST

1 gf

5 gf

10 gf

EXPERIMENTAL PART

Levitation induction melting — Mini-ingots — Precision cutting machine for sampled the alloy disc — Machined samples — Grinding and polishing — Samples embedded
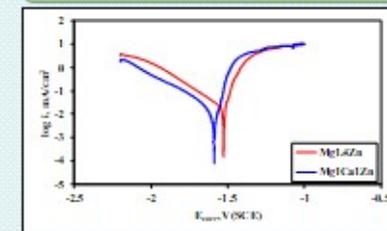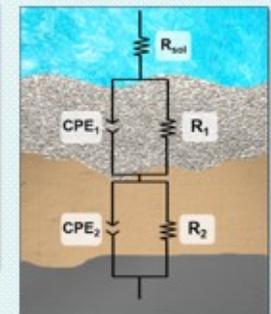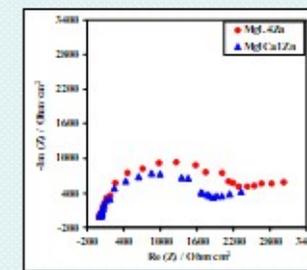
ELECTROCHEMICAL TESTS

CORROSION POTENTIAL

CORROSION RATE

ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY
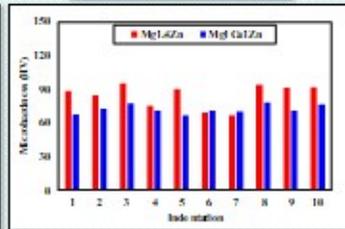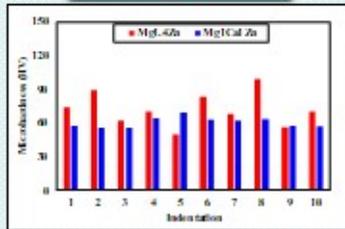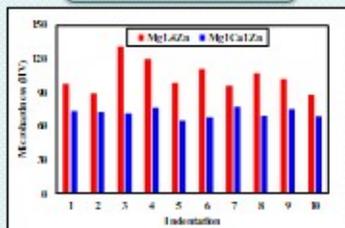
CONCLUSIONS

Both samples have an α-Mg matrix with intermetallic phase precipitation in the microstructure of both samples and the presence of more pronounced edges when Ca is added. The addition of Ca has a negative influence on the corrosion resistance of the sample and also decreases the hardness values, but with lower standard deviation values. In future research, a higher percentage of Ca will be added to confirm these results.