BioMg®250 Bioabsorbable Implants

BioMg®250 has been invented by nanoMAG LLC for advanced applications to fix orthopaedic trauma. Such potential applications are for a) knee repair, b) shoulder trauma, c) craniofacial fixations, d) small bone foot and hand uses, and e) scaffolds for spine and hip and femur trauma.

The following figures provide further information on BioMg®250 as follows:

Figure 1. Structure of BioMg®250 and New Bone Growth

Results of 52-week implants in New Zealand rabbit knees. As a BioMg®250 screw dissolved, it was replaced by a reaction zone containing oxygen and some Ca and P. In turn this reaction zone was replaced with new bone as evidenced by high Ca and P. Mn showed no buildup in either zone.

Figure 2. Yield Strength of Implant Alloys

BioMg®250 compares favorably to Ti, stainless steel and polymer implants on matching bone strength.

Figure 3. Modulus of Elasticity of Implant Materials

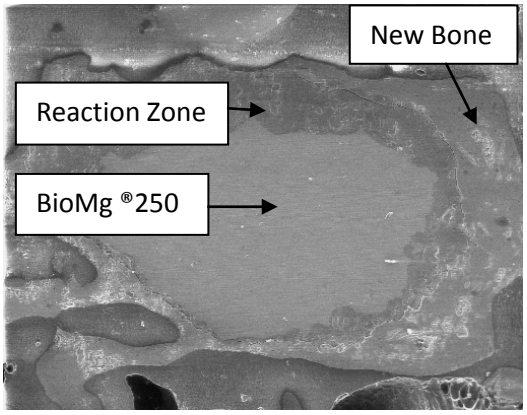
BioMg®250 compares favorably to Ti, stainless steel and polymer implants on matching stiffness of bone.

Figure 4. Comparison of Density of Biomedical Implants

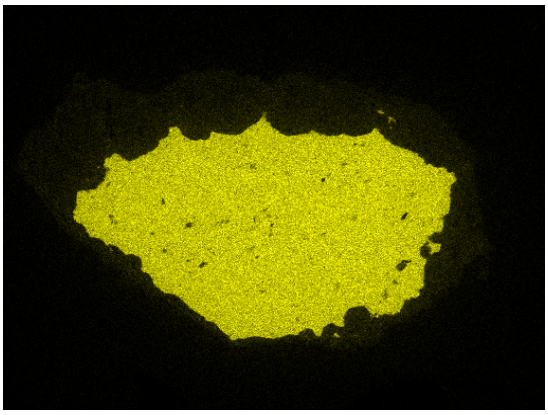
BioMg®250 compares favorably to Ti, stainless steel and polymer implants on density. BioMg® 250's alloying elements of Mg, Zn, Ca, Mn are essential nutrients and all foster new bone growth.

Figure 1

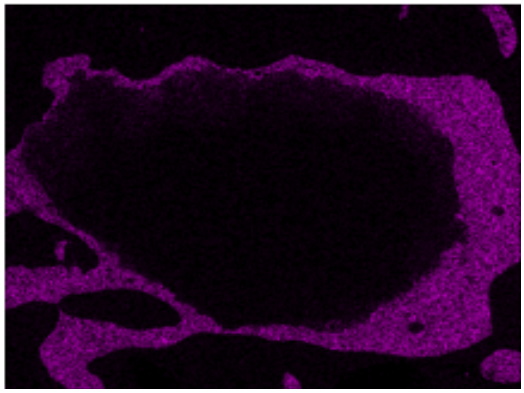
Structure of BioMg®250 and New Bone Growth



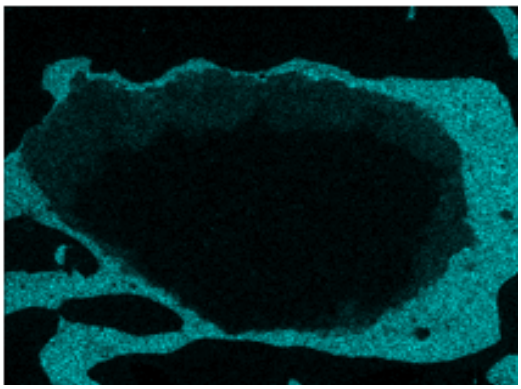
SEM of 52 Week Implant Section



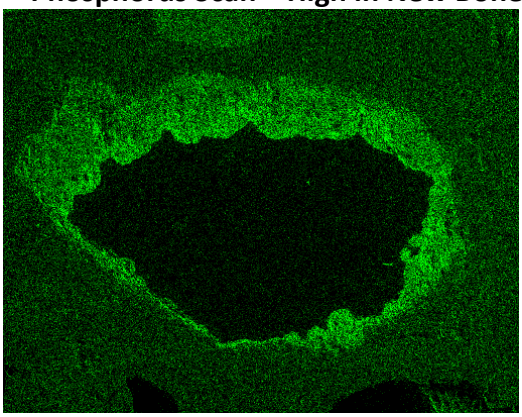
Magnesium Scan – Solid Implant



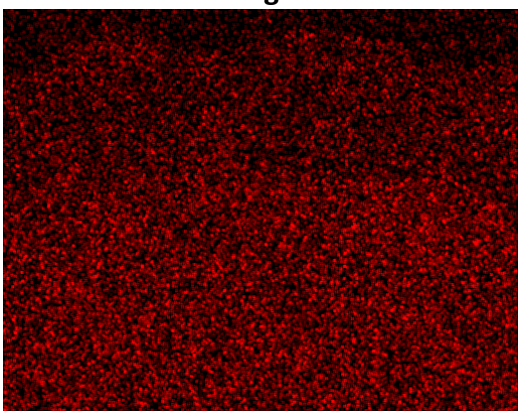
Phosphorus Scan – High in New Bone



Calcium Scan – High in New Bone



Oxygen Scan – High in Reaction Zone



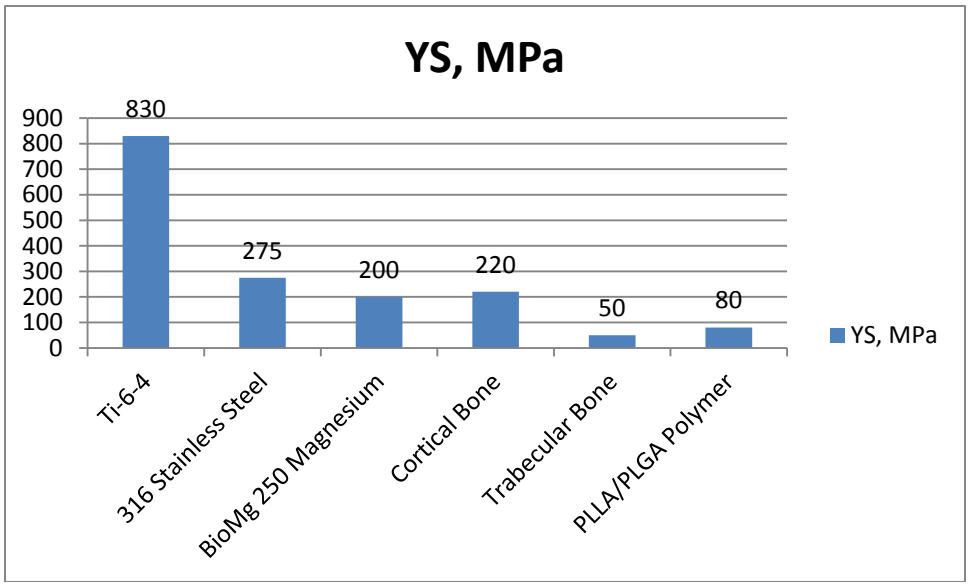
Mn Scan – No Concentration

nano MAG a revolution in magnesium Mg

Contact Dr. Stephen LeBeau at slebeau@nanomag.us

Figure 2

Yield Strength of Implant Alloys



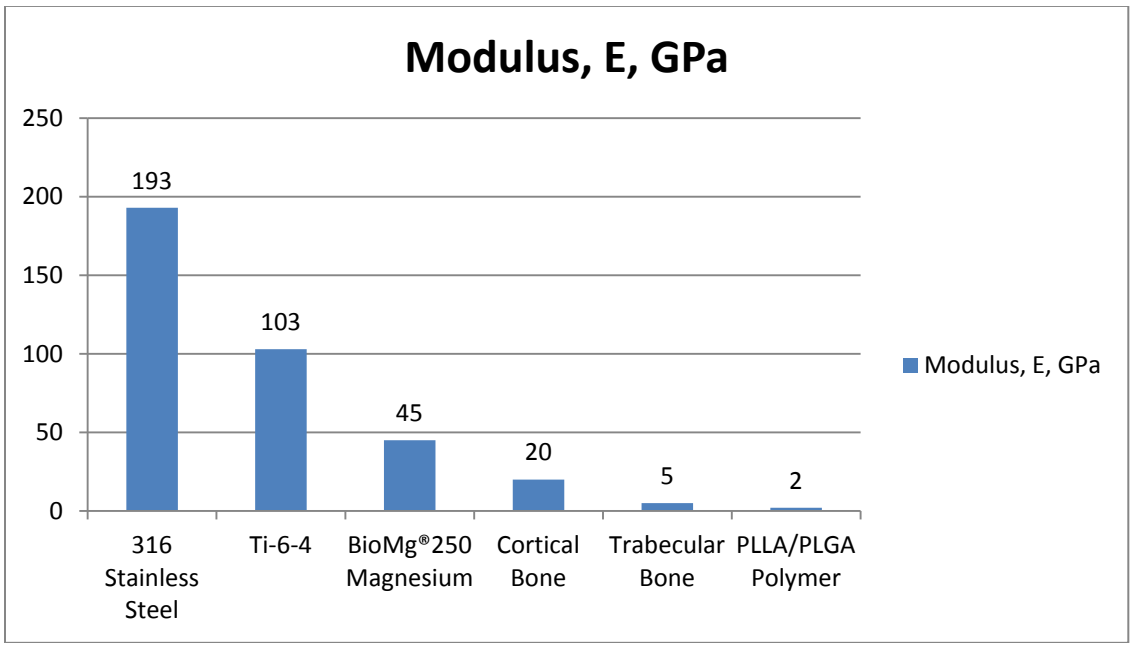
- Yield strength of BioMg®250 matches cortical bone, therefore minimal stress shielding
- BioMg®250 suitable for load-bearing applications
- Yield strength of stainless steel and Ti-6-4 higher than bone, hence stress shielding and bone resorption
- Yield strength of polymer is lower than cortical bone, hence limited to non-load bearing applications

nano MAG a revolution in magnesium Mg

Contact Dr. Stephen LeBeau at slebeau@nanomag.us

Figure 3

Modulus of Elasticity of Implant Materials



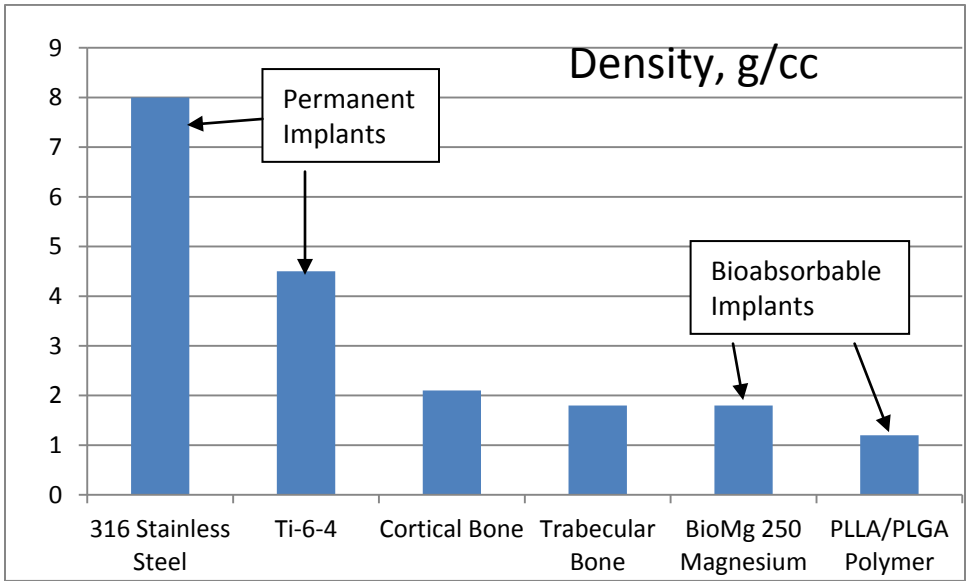
- Stainless steel and Ti-6-4 are much stiffer than bone, hence stress shielding
- BioMg®250 stiffness is much closer to bone, hence minimal stress shielding
- Polymer has very low stiffness compared to bone, limiting to non-load bearing applications

nano MAG a revolution in magnesium Mg

Contact Dr. Stephen LeBeau at slebeau@nanomag.us

Figure 4

Comparison of Density of Biomedical Implants



- BioMg ®250 Magnesium Implants are closer to density of bone than non-absorbable and permanent Stainless Steel and Ti-6-4 implants

- BioMg®250 Magnesium Implants are closer to density of bone than bioabsorbable polymer implants

- BioMg®250 base of Mg and it's alloying elements (Zn, Ca, Mn) are essential nutrients and all foster new bone growth

nano MAG
a revolution in magnesium Mg

Contact Dr. Stephen LeBeau at slebeau@nanomag.us