APPLICATION OF SONOCHEMISTRY FOR FORMATION OF NANOSIZED SILVER AND SILVER/HYDROXYAPATITE COMPOSITE PARTICLES

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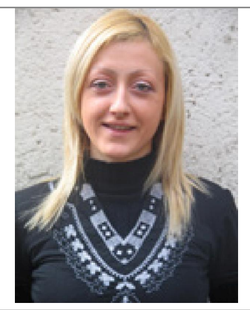


Sonochemical synthesis

Physical & Chemical Effects of ultrasound

- **Nucleation**
- **Growth**
- **Implosion**

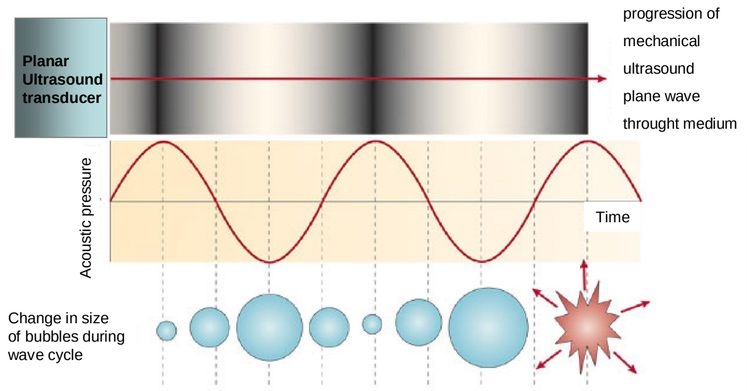
- Hot spot
- Shock Wave

- Micro jet

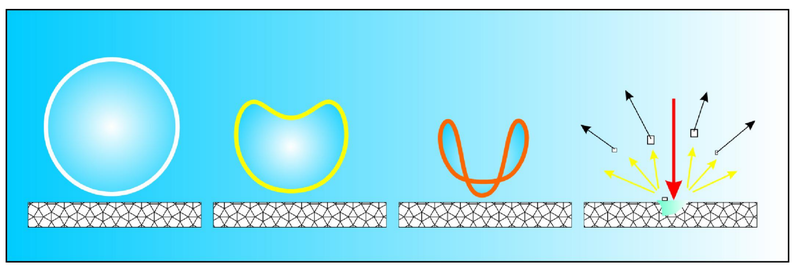
Locally developed parameters:

- T~ 5000ºC
- p ~1000 atm
- ΔT~10^{10} K/s

Liquid/Liquid System



Liquid/Solid System



Results

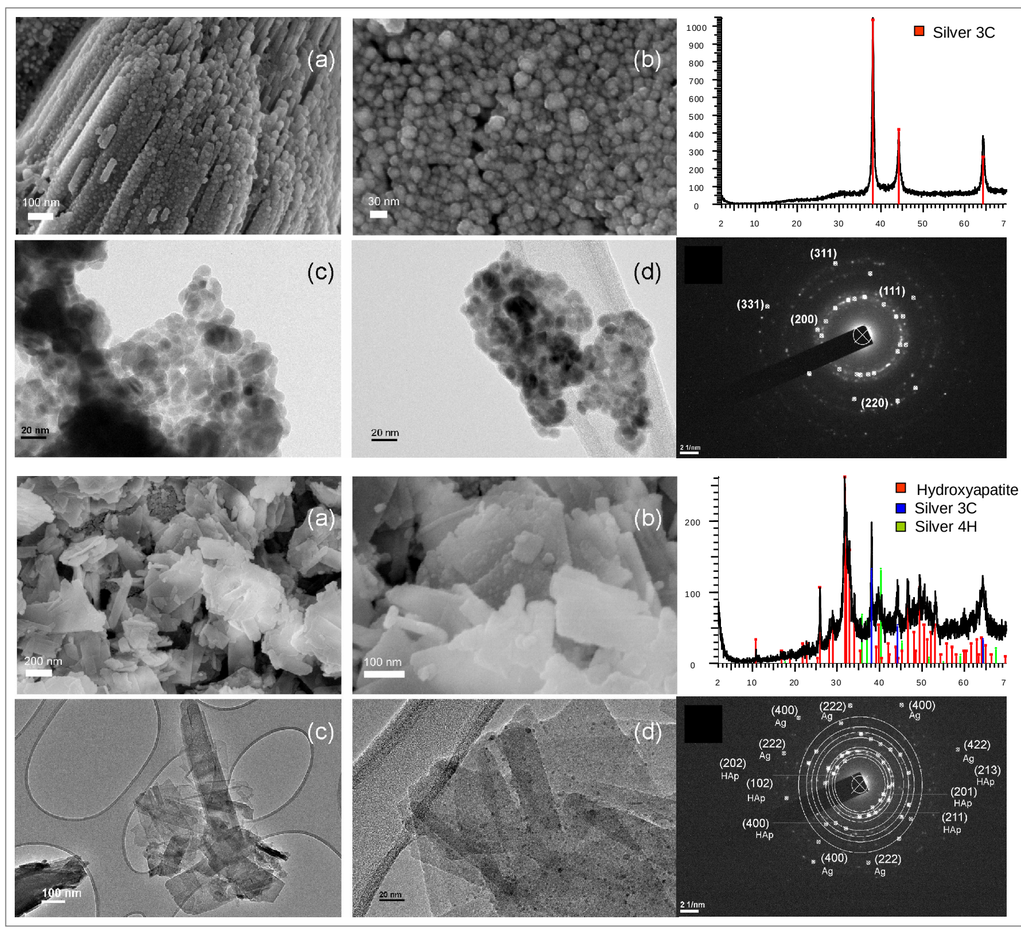


Fig. 1: SEM, TEM and XRD of Ag particles.

Fig. 2: SEM, TEM and XRD of Ag/HAp particles.

Noble metals and hydroxyapatite properties

§ Nanosized silver is well-known antibacterial agent.

§ Hydroxyapatite is bioactive and osteoconductive bioceramics.

The main goal of our work is:

- Application of sonochemical synthesis method for preparation of nanosized silver particles and silver/hydroxyapatite composite for potential biomedical application.

Discussion & Conclusions

Obtained result show that:

§ Monophase Ag with the structure of cubic silver (Ag 3C) and sphere-like morphology with particles up to 30 nm in size forms.

§ In the case of HAp/Ag composite, Ag with the structure of cubic (3C) and hexagonal (6H) silver and sphere-like morphology with particles up to 10 nm in size attached to the surface of HAp rods was obtained.

<u>Morphology and structure of Ag particles within HAp/Ag composite can be influenced by the contribution of HAp surface to Ag particles growth.</u>

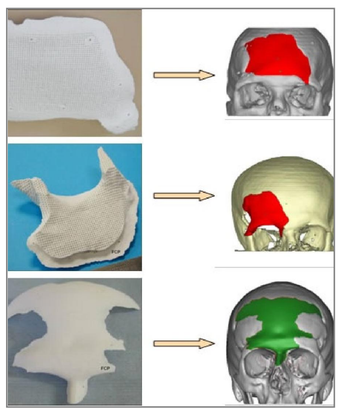
Applications & Perspectives

APPLICATION OF MATERIALS WITH ANTIBACTERIAL PROPERTIES

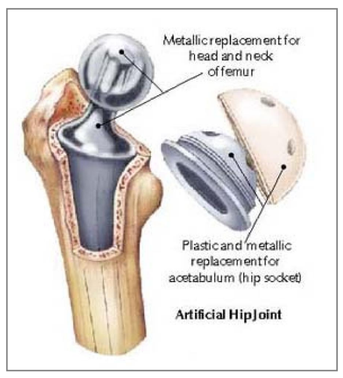
NANOMEDICINE

Prevention

Therapeutics

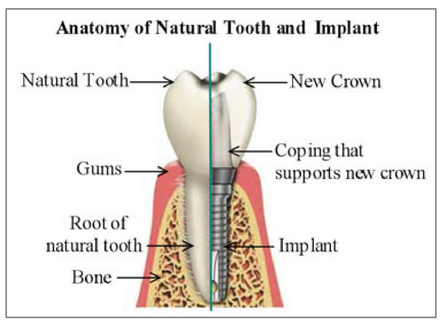


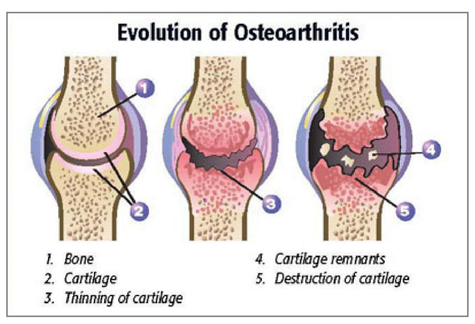
Implant fabrication



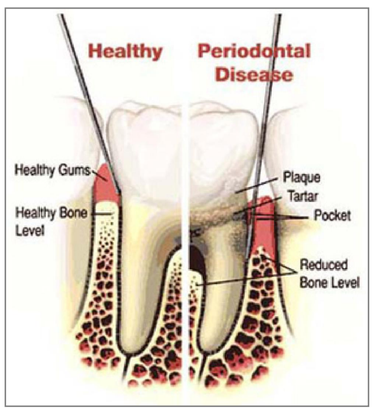
Metalic implant coatings

Dental fillers or Implant coatings





Treatment of orthopedic infections



Treatment of dental infections