Gold nanoparticles produced by ultrasonic spray pyrolysis

S. Stopić, B. Friedrich - IME Process Metallurgy and Metal Recycling, RWTH Aachen University, Germany
R. Rudolf, I. Anžel - Institute of Materials Technology, University in Maribor, Slovenia

Main aims

1. New process for gold recovery from the jewellery scrap
2. Synthesis of gold nanoparticles using an ultrasonic spray pyrolysis method
3. Control of particle morphology

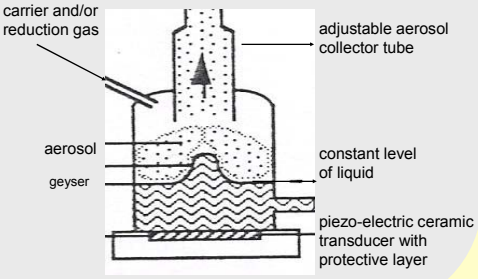
Nanogold particles and its application

NASA: Nanogold rods against cancer

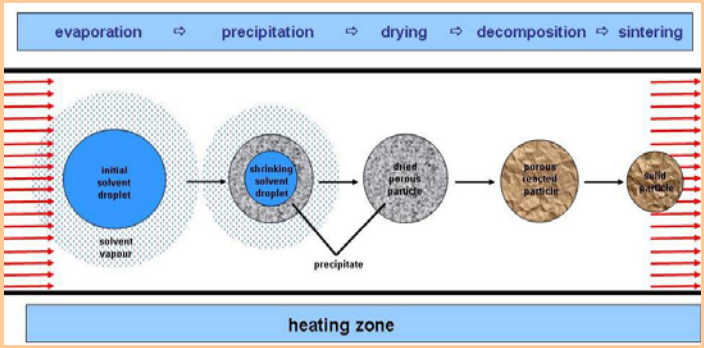
Goldparticles as Nanoresonator

Experimental method

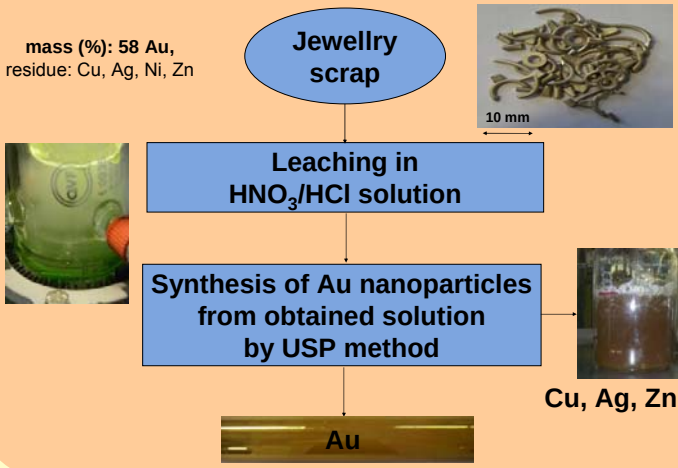
Parameters:
Temperature (°C): 300-800
Time (hour): 2
Ultrasonic frequency (MHz): 2.5
Atmosphere: H_2 and N_2
Flow rate (L/min): 3-5
Au- concentration (3-5 g//l)



Mechanism of USP- synthesis

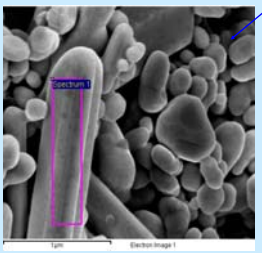


Innovative USP route for Au-nanoparticles synthesis

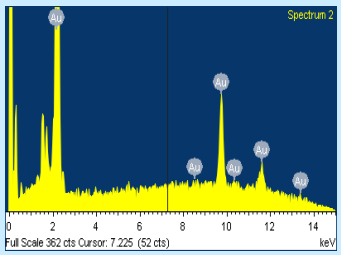


Results

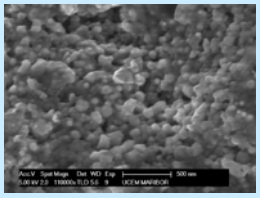
Different shapes (rods, sphere, and round forms) of Au nanoparticles were obtained in H2- and N2-atmosphere



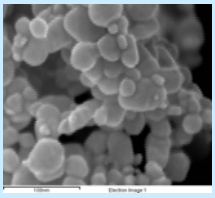
T=800°C, H_2



EDS Analysis



T=800°C, H_2



T=300°C, N_2

Conclusion

Spherical and rod nanosized particles of gold were synthesized by ultrasonic atomization of chloride-nitrate solutions based on gold and alloying elements (Cu, Ag, Zn and Ni) and a subsequent decomposition of obtained solution at temperatures 300°C and 800°C in hydrogen and nitrogen atmosphere.

Future research steps

Synthesis of nanoparticles from water solution based on gold in the absence of any impurities.

Testing of biocompatibility and an application of nanogold in medicine and catalysis

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Contact: Dr.-Ing. Srećko Stopić
IME Process Metallurgy and Metal Recycling
RWTH Aachen University
E-Mail:SStopic@ime-aachen.de