CHARACTERIZATION OF METALLIC NANOPARTICLES OBTAINED BY BIOMASS REDUCTION

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Nowadays precious metal recovery technologies use harmful chemicals that may represent a risk to the environment and public health. This is the reason why it is necessary to develop clean, non-toxic and environmentally friendly procedures to recover precious metals. The use of biological organisms in synthesis and assembly of nanoparticles has received an increasing interest. In these experiments, dead brown and red seaweeds (*Ascophyllum nodosum* and *Chondrus crispus*) have shown to be efficient for gold (III) reduction. Seaweeds reduce gold (III) to gold (0) and produce nanoparticles. The reduction process was found to be dependant on pH, time, temperature and concentration of biomass. UV-vis spectrums and transmission electron micrographs showed nanoparticles of several shapes and sizes. In order to resolve the mechanism of reduction of gold (III), the evolution of pH and potential was measured.

References:

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Figures:

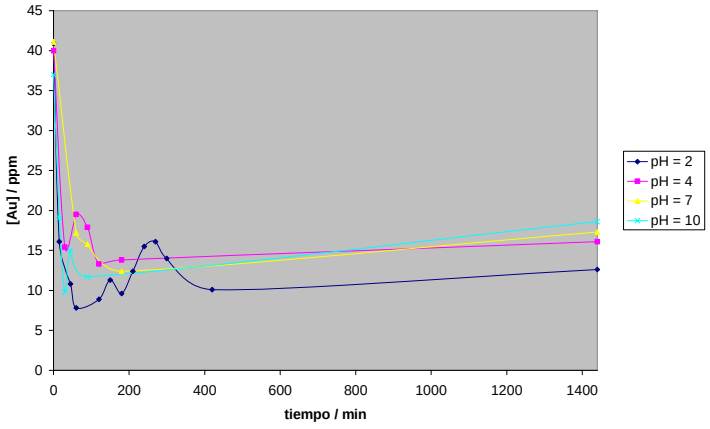
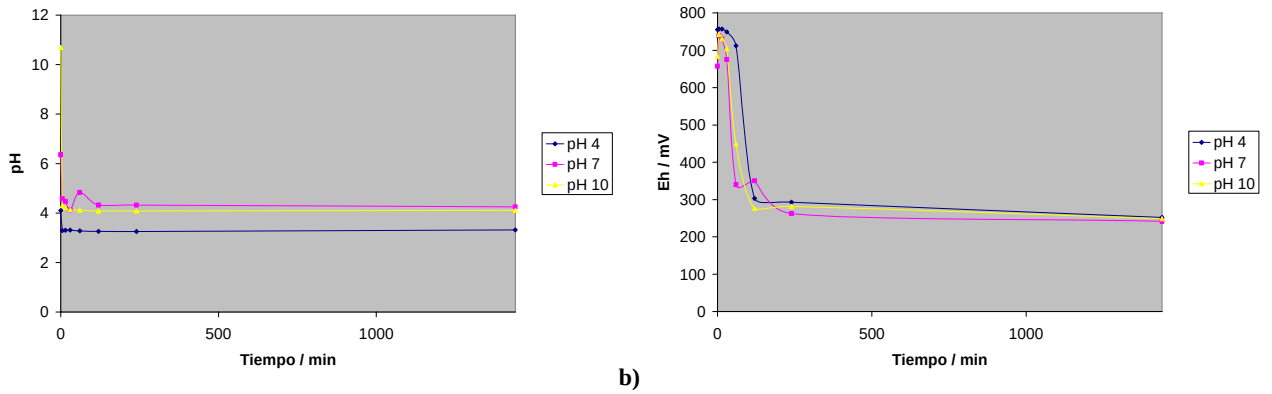
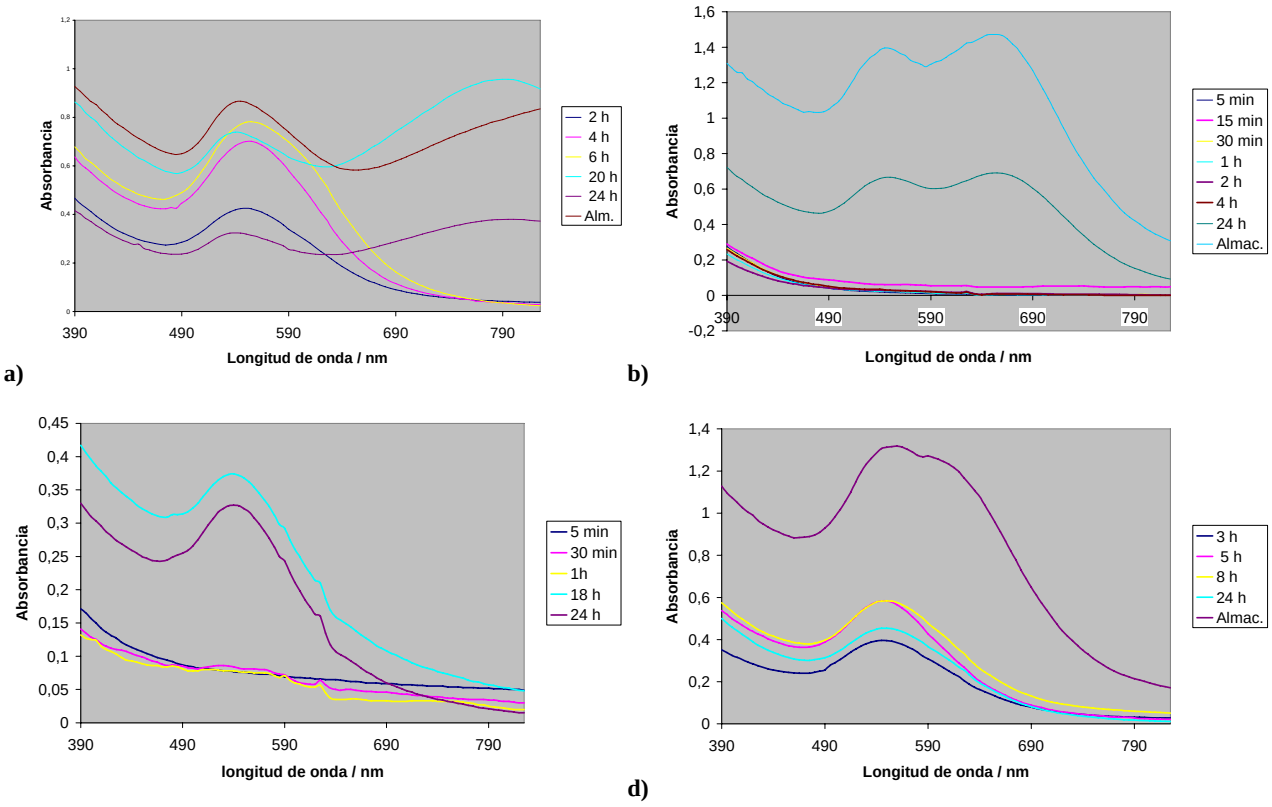


Fig. 1. Influence of initial pH in reduction of $AuCl_4^-$ with 2 g/L *Ascophyllum nodosum*.



a) **b)**

Fig. 2. Evolution of pH (a) and potential (b) in reduction of $AuCl_4^-$ with 5 g/L *Ascophyllum nodosum* for different values of initial pH..



a) **b)** **c)** **d)**

Fig. 3. UV-vis spectrums of Au nanioparticles dissolutions produced with 5 g/L *Chondrus Crispus* with different values of initial pH: a) pH = 2, b) pH = 4, c) pH = 7, d) pH = 10.

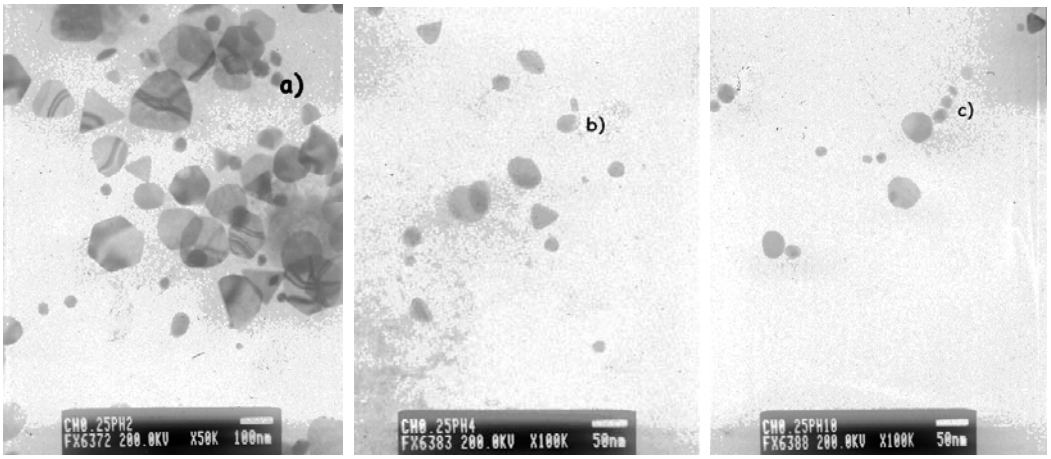


Fig. 4. Photographs of Au nanoparticles obtained with 5 g/L *Chondrus crispus* observed by TEM: a) pH 2, b) pH 4, c) pH 10.