

# Block copolymers in the synthesis of gold nanoparticles. Two new approaches: Copolymer aggregates as reductants and stabilizers and simultaneous formation of copolymer aggregates and gold nanoparticles

Leiva, Angel

Fuentes, Irma

Bossel, Esteban

Urzúa, Marcela

Méndez, Maximiliano

Pino, Maximiliano

Radíc, Deodato

Márquez, Valeria

González-Nilo, Fernando D.

© 2014 Wiley Periodicals, Inc. In this article, innovative applications of amphiphilic triblock and pentablock copolymers in the synthesis of gold nanoparticles are reported. The synthesis of gold nanoparticles is performed using two methods. In the first method, micellar aggregates of block copolymers and  $\text{AuCl}_4^-$  ions directly react in water; the nanoparticles obtained by this method are variable in size and are associated with copolymer aggregates. In the second method, two processes take place simultaneously: the aggregation of block copolymers and the reduction of Au (III) by the copolymers to form nanoparticles. In contrast with the first method, in this case, the nanoparticles obtained are located inside the copolymer aggregates. In both methods of synthesis, the block copolymers act simultaneously as reducing and stabilizing agents. To understand the role of copolymer aggregates in the synthesis of nanoparticles, molecular simulation methods are used. The gold nanoparticles, copol