

Synthesis of gold ring-shape nanoparticles using co-sputtering over liquids

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The structuration of materials at the nanoscale is of great concern since the properties of a material can be drastically enhanced. Among all structures, nanoparticles are very appealing due to their high surface area.[1] Nowadays, it is possible to produce nanoparticles by chemical or physical ways. However, the chemical way uses toxic reagent and a complex process of purification. Therefore, to avoid these drawbacks, it appears that plasma vapor deposition techniques are an effective alternative.[2] By sputtering a metallic target over a liquid substrate, very small nanoparticles (few nanometers) are created from a wide variety of metal including titanium or silver.[3] In this contribution, we report the synthesis of gold-copper precursor nanoparticles by co-sputtering over liquids. These nanoparticles are further annealed and dealloyed to produce ring-shape nanoparticles. The dealloying process deals, in this case, with the etching of copper from the precursor alloy leading to a ring-shape gold structure. The study involves the characterization by transmission electron microscopy and small-angle X-ray scattering.

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References

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