

Ru nanoparticles plasma sputtering: effect of the presence of an organic liquid

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The diminution of the complexity of hydrogen storage, handling and transport requires the development of metallic nanoparticles materials with high catalytic and electrocatalytic potential, synthesised using innovative methods with a high potential for transfer to industry. There are currently several methods for synthesising these nanoparticles,[1,2] but not all of them are suitable for large-scale production because of the difficulties of reproducibility and purification of the process. Sputtering onto Liquid (SoL) is a favourable technique for synthesising ultra-pure NPs, halfway between the physical and chemical methods. It combines the advantages of both methods (purity of the grains and control of their size). In fact, the target used is considered pure and the liquid acts not only as a solvent but also as a protector for the formation of the NPs. As a result, this process does not require an additional stabilisation step, while still being capable of synthesising NPs of controlled size, shape and purity.[3]

In order to study the deposition process, we carried out a comparative study of the properties of Ru nanoparticles deposited into PolyEthylene Glycol (PEG) on a Si substrate in the presence or not of PolyEthylene Glycol (PEG). Sputtering parameters such as pressure, power and deposition time were varied and the physical-chemical and structural properties of the Ru materials were characterized by scanning electron microscopy, energy dispersive X-ray analysis and ion beam analysis and X-ray diffraction.

Key words : Plasma sputtering, Nanoparticles, PEG liquid.

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