This work describes a deposition methodology for growing a reproducible set of aluminum nanoparticles (Al-NPs) uniformly distributed over the surface of non-conductive substrates (nitrocellulose film, fused silica, monocrystalline silicon wafer and zinc oxide) using a DC sputtering system. We correlate the deposition parameters (pressure in the reaction chamber, position of the substrate relative to the magnetron, power delivered the DC source and deposition time) with the nanometric characteristics of the deposited Al-NPs (particle shape, particle distribution, particle density and particle average size). We observed that the Al-NPs characteristics will not change even though different substrates are used for their deposition.

**Keywords:** Aluminum Nanoparticles, DC Sputtering, Nanostructural Characterization

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