

PO2056

Gold nanoparticles preparation by converging-type Atmospheric Pressure Plasma Jet

Yu-Lin Kuo¹, Je-Wei Lin², Kuen-Yu Tsai²

¹Department of Mechanical Engineering, Taipei, Taiwan ²NTUST, Taipei, Taiwan

ylkuo@mail.ntust.edu.tw

A converging head embedded in the atmospheric pressure plasma jet was designed for the gold nanoparticle preparation via precursor solutions of H₂AuCl₄. Effect of DC powers and precursor solution concentrations were investigated to realize the parameters by converging-type atmospheric pressure plasma jet, as well as the plasma plume temperature evolution. Materials characterizations by transmission electron microscope (TEM), absorption spectrometer (UV/vis), and X-ray diffraction (XRD) were performed to analyze the surface morphology and particle size of gold nanoparticles. According to the measured plasma plume temperature, the internal temperature reached over 400 °C, which can be feasibly made for the thermo-decomposition of H₂AuCl₄ solution under atmospheric pressure plasma. Analyzed results also show the precursor concentration of H₂AuCl₄ solution and applied plasma power evidently influenced the particle sizes and surface morphologies of gold nanoparticles. The optimal process in this study to prepare 20nm-Gold nanoparticles was performed at the conditions of 0.05mM H₂AuCl₄ precursor solution and plasma power of 300W. Meanwhile, the verification on the converging-type head in an APPJ process via H₂AuCl₄ precursor solution for the preparation of gold nanoparticles was feasibly achieved.

Keywords

Atmospheric Pressure Plasma Jet

Gold

Nanoparticle