

COPPER FIXATION ON POLYAMIDES USING SUPERCRITICAL FLUID CARBON DIOXIDE AND THERMAL TREATMENT

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The fixation of copper metal on polyamide substrates, PA66, was investigated using supercritical fluid carbon dioxide, scCO_2 , and post-annealing. After Palladium (II) acetylacetonate metal complex, $\text{Pd}(\text{acac})_2$, seeding into the polymer surface under scCO_2 conditions, post-annealing and electroless copper plating were carried out. Then, the thin-coated sample was newly annealed at less than 200 °C at air condition. As a result, a light-greenish copper layer covered the plate surface. Thus, due to post-annealing, the reaction between the firstly deposited $\text{Pd}(\text{acac})_2$ on the surface of PA66 and the subsequently deposited thin copper layer is activated and changes from characteristic copper color to a light-greenish color layer which adheres deeply to polymer surface. To verify the Pd particles seeded in the polymer surface and the changes in chemical shifts, X-ray photoelectron spectrometry (XPS) analyses were performed. The results revealed that post-anneal induced Pd particles diffusion and deeper penetration of Pd complex and some fragments into the substrate. Also, X-ray diffraction (XRD) and infrared (FT-IR) analyses confirmed the Cu immobilization.

Keywords: polyamides, palladium (II) acetylacetonate, supercritical fluid carbon dioxide, electroless plating.

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