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IMPROVEMENT IN ADHESION OF ELECTROLESS COATING ON PLASTIC SUBSTRATES: A REVIEW

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ABSTRACT

Recently plastics has attained wide application base for industries like electronics, automobile, textile, medical primarily due to low weight, relatively low cost, as well as good strength when correctly designed. The most common industrially relevant plastics are polyethylene terephthalate, polyvinyl chloride, low-density polyethylene, polypropylene, and polystyrene. However, to impart property like electrical conductivity as well as to enhance wear and corrosion resistance, there is necessity of depositing suitable metallic coating on plastic surface. Available methods are physical vapour deposition, plasma impulse chemical vapour deposition, flame and arc spraying, electroless deposition. Among the different methods, electroless coating stands out owing to capability of depositing uniform coating over complex contours, low bath temperature below melting point of plastic substrate, low equipment and manufacturing cost. However, the main challenge is attaining good adhesion of coating on plastic, which is very poor in the conventional deposition method. This article reviews four methods for enhancing adhesion viz. electroless copper polyalloy plating in combination with UV/ozonolysis irradiation, laser-induced selective activation (LISA) method, novel plating with assisted super-critical (sc) CO_2, and molecular bonding with electroless spray plating. The ultraviolet lights help to clean plastic surfaces and removes any carbonaceous residue, which results in excellent adhesion. Laser is applied to clean, roughen, and activate the plastic surface. The interlocking phenomenon between metal and plastic occurs due to super-critical CO_2 assistance. Due to the UV-grafting of P-TES and selfassemble of N-TES, adhesion between metal to the plastic substrate is enhanced.

Keywords: Electroless coating; Adhesion; Plastic; Substrate pretreatment

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