

Inkjet Printable Etching and Plating Resists

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Abstract

Masking technology is widely used in the manufacture of electronics, connectors, precision parts, and even in decorative metal working. The common thread in all these industries is the use of subtractive etching techniques and additive plating techniques to build the end product. Commonly used masking materials include liquid and dry film photoresists, both of which require extensive equipment manufacturing costs. Use of photoresist technology also requires wet chemistry development steps, as well as the associated rinse water and waste streams that accompany them.

As an alternative processing scheme to masking technology, an inkjet printable resist material can be printed only in the areas of the substrate where resist is desired. The use of inkjet printable resists eliminates the lamination and wet chemistry development steps, masks, alignment, and rinse water associated with the development of the photoresist. Previous attempts at inkjet printable resists, however, have resulted in photoresist-based inks that have spreading issues upon printing, or the use of wax-based inks that have limited rigidity and chemical resistance. Presented here is a series of *hybrid* inks that combine the best attributes of both ink options. These inks give remarkable structural integrity upon printing and significant chemical resistance to etching and plating chemistries upon exposure.

LITHOJET™ inks are currently being used in a variety of commercial applications. The inks can be tailored for use in various industries by making small changes in the formulation. The photochemical machining industry version of the ink can be used as a strong etch resist, withstanding the harsh etching capability of Ferric chloride to etch up to > 15 mils deep. The printed circuit board ink can be used as an etch resist in place of dry film for inner layers, and as an electroplating resist for tin plating. The connector ink can be used as a plating resist in gold electroplating baths to reduce the amount of gold electroplated in undesirable areas of the connector.

This presentation explores the promise of what inkjet printing can bring to process simplification, cost reduction and improved capabilities in the photochemical milling, printed circuit board, connector, and metal working industries.