"Carrier Gas" Sensitizers for Improved Laser Ablation Performance of Coating Films (RFT-178)

Invention Summary

Situations where laser ablation produces a ‘carrier gas’ result in cleaner and higher resolution ablation structures, because expulsion of the carrier gas carries away polymer fragments and ablation debris. Carrier gases are only produced where certain chemical constituents are present in a polymer matrix. Scientists at NDSU have developed a sensitizer that essentially builds a carrier gas into thin films. As a result, a wider range of films can be used for electronics, microfluidics, etc., and these surfaces can be subsequently ablated with extreme precision.

This technology is beneficial for a wide range of situations, including:

- Multilayered electronic devices, where a UV curable coating is desired, which requires subsequent modification (e.g. drilling of ‘vias’ through the polymer to make connections between chips)
- Microfluidics devices where subsequent ultra-precise laser drilling follows the application of thin films

The chemistry involves incorporation of oxalyl containing compounds, which when exposed to the laser pulse, generate carrier gas. Additional sensitizing groups, e.g. naphthalene, may be incorporated to further enhance the performance.

Benefits:

- More complete polymer removal from target areas
- More precise shapes and smaller holes may be created
- Little if any impact on the basic properties of the thin film coatings

Patents

This technology is the subject of Issued US Patent Nos. 8,114,567, 8,445,174, and 8,704,348 and is available for licensing/partnering opportunities.

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NDSURF Tech Key

RFT, 178, RFT178