Visual Identification of Organic Residue on Microelectronic Components via In-Process Visible Light Fluorescence

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Abstract

While fluorescence is commonly used to observe conformal coatings; such visual techniques have previously proven ineffective for the detection of epoxy resins in microelectronics hardware. Where UV fluorescing additives within an epoxy were prohibited, 460nm blue light demonstrated a strong ability to resolve thin layers of cured epoxy resins on microwave electronics modules. Epoxy resin bleed has plagued chip and wire assembly and was previously not detectable using low cost in-process techniques. Using a 460nm blue LED and a 515nm long pass filter it is possible to readily visualize cured epoxy resins and many other contaminants on gold bond pads and other microelectronics components. This fluorescence microscopy method can be integrated into existing bench top stereoscopes and does not require the use of expensive and often destructive analytical techniques such as IR spectroscopy or XPS. Similarly, this method can be easily adapted for use on modules of any size. Unlike UV fluorescence techniques, no hazardous wavelengths of light are used greatly reducing the health risks posed by broadband UV light sources.