

Implementation of a Photo-Curable 3D Additive Manufacturing Technology with Grey Capability by Using Piezo Ink-jets

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Abstract : The 3D printing is a combination of digital technology, material science, intelligent manufacturing and control of opto-mechatronics systems. It is called the third industrial revolution from the view of the Economist Journal. A color 3D printing machine may provide the necessary support for high value-added industrial and commercial design, architectural design, personal boutique, and 3D artist's creation. The main goal of this paper is to develop photo-curable color 3D manufacturing technology and system implementation. The key technologies include (1) Photo-curable color 3D additive manufacturing processes development and materials research (2) Piezo type ink-jet head control and Opto-mechatronics integration technique of the photo-curable color 3D laminated manufacturing system. The proposed system is integrated with single Piezo type ink-jet head with two individual channels for two primary UV light curable color resins which can provide for future colorful 3D printing solutions. The main research results are 16 grey levels and grey resolution of 75 dpi.

Keywords : 3D printing, additive manufacturing, color, photo-curable, Piezo type ink-jet, UV Resin

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