**Stereolithographic Additive Manufacturing of Ligneous**

**Structures with Ramose Patterns**

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Stereolithographic additive manufacturing has developed a novel manufacturing technology for practical components with theoretically designed geometric structures. Fine metal or ceramic particles were dispersed into photosensitive resins to create material paste as 3D printer inks. Formed composite precursors could be dewaxed and sintered successfully to obtain engineering components. In this investigation, ligneous objects were processed thorough computer aided design, manufacturing and evaluation. In ramose pattern modeling as conifer or shrub types, ramification numbers and dendritic propagations were mathematically determined along Fibonacci series or golden angles theories. Micro woodchips of 150 μm in average diameters were dispersed into urethane resin at 39 % in volume fraction. The resin paste viscosities were optimized for the stereolithography through the systematic modulations of woodchips volume fractions. Obtained mixed paste of 3000 mPa&middot;s in viscosity was spread smoothly on a flat substrate with 300 μm in layer thickness by using a mechanical squeegee. Ultraviolet laser beam of 355 nm in wavelength was focused into 50 μm in diameter and scanned at 1000 mm/s to draw cross sectional solid patterns. Photo polymerization phenomena of the resin phases between the micro woodchips were simulated and visualized by finite element analysis in the electromagnetic fields to optimize the ultraviolet laser conditions on lithographic processes. After layer stacking processes, the ligneous structures of 50 mm in height were fabricated. The artificial plants of 500 mm order will be applied to natural mimetic arborescent flames of environmental sensors in the mountain forest area. Mounted sensors of temperature and humidity as artificial flowers will work by electric energy generated from equipped solar panels as artificial leaves. These imitation plants will be possible to monitor ideally environmental changes without interferences for surrounding space.