# Experimental study of the additive manufacturing of silicon nitride

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**Abstract**
Stereolithography of UV-curable ceramic suspensions is an additive manufacturing technique with high precision and great resolution to fabricate complex ceramic parts. While it widens the possibilities of applications, one of the drawback of this method is the low wall-thickness of the parts. The polymers forming the network structure upon cross-linking undergo pyrolysis in a step called debinding. During debinding, the gaseous compounds going through evacuation channels create internal pressures, often resulting in crack formation. When this PhD started, the critical wall-thickness where crack-free parts are obtained was located between 4 and 5 millimeters for silicon nitride. Thanks to an optimization of the debinding relying on TGA analysis, defectless parts with a wall-thickness of up to 11 mm were obtained. During this optimization, the layer thickness impact was studied and it was revealed that a low layer thickness reduces risks of cracking. Finally, the mechanical properties were measured, showing values equivalent to silicon nitride fabricated by conventional methods.