

# A Study on Mechanical Properties of Selective Laser Melting

Sha Ma<sup>1</sup>, Kozo Osakada<sup>2</sup>, Fumie Abe<sup>2</sup>

<sup>1</sup> *Singapore Institute of Manufacturing Technology, Singapore*

<sup>2</sup> *Osaka University, Osaka, Japan*

[sma@SIMTech.a-star.edu.sg](mailto:sma@SIMTech.a-star.edu.sg)

## ABSTRACT

Rapid prototyping (RP) technology enables quick production of complex physical models directly from CAD data without any tooling, machining and conventional manufacturing[1]. It is playing an increasingly significant role in today's time- and cost-driven product development. In recent years, direct fabrication of metallic parts and tools utilizing layer manufacturing technology has become a main aim, as there is a great demand of such technologies in industry. Selective Laser Melting (SLM) is a one-step method for building metallic parts by completely melting metal powder in the focal zone of a laser beam. The paper first introduces our developed SLM experiment apparatus. Mechanical property of built parts is one of the key factors to determine its acceptance to industry application. Therefore, the mechanical properties of parts built by SLM method are measured and some important affecting factors, such as material characteristics, protective gas atmosphere, scanning pattern and process parameters, are also investigated to explore their influence. Experiment results show that SLM method has the good potentiality to satisfy this industry requirement.