3D MICROWAVE PRINTING TEMPERATURE CONTROL OF CONTINUOUS CARBON FIBER REINFORCED POLYMER COMPOSITES

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Keywords: 3D microwave printing; continuous carbon fiber; temperature control strategy.

3D printing, also known as additive manufacturing, has been studied for more than 20 years for potential application in aerospace, automotive and medical treatment [1]. The most popular printing technologies, like Fused Filament Fabrication (FFF) processes have been developed for continuous fiber reinforced polymer composites [2]. However, the less efficient heat transfer of conventional heating leads to the slow printing speed, small printing amount and low heating temperature. On the contrary, electromagnetic has the rapid energy radiation, volumetric, selective and uniform heating advantages [3]. We creatively present a 3D Microwave Printing (3DMP) method to fabricate the continuous carbon fiber reinforced polymer composites with much faster speed and higher printing amount compare with the traditional 3D printing technologies. In this paper, the 3D microwave printing temperature control method was achieved. The flow chart to establish the relationship of microwave power and printing speed is shown in Fig. 1 (a). The measured printing temperature and microwave power during the printing process are illustrated in Fig. 1 (b).

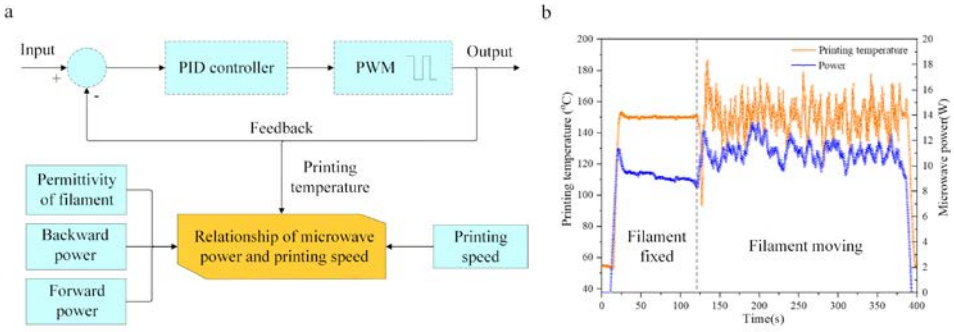

Fig. 1. Temperature control of 3D microwave printing continuous carbon fiber reinforced composites, (a) temperature control method and the flow chart to establish the relationship of microwave power and printing speed, (b) measured printing temperature and power.

References

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