

모세관력 발생을 위한 대면적 박판금속 표면 미세패턴 성형

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Micro Pattern Grooving on Metal Sheet for Capillarity

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Abstract

Capillary grooves were formed on metal sheet by roll engraving method. New micro forming process was developed to get micro fluidic channel on metal surface. Small disk which had shape of pizza cutting roll, made with tungsten carbide was used as forming tool. The disk was allowed to spin freely on surface of workpiece with vertical load. The tool edge penetrated into the sheet and the workpiece was moved by precision XY table. The roll engraving method was applied on copper sheet which had 200 μ m thickness. Narrow and long groove of 70 μ m width and 100mm length was fabricated successfully with 5N vertical load. The fabricated v-grooves duplicated the sectional profile of the forming roll edge. The current possible minimum channel angle is 130°. It is needed to sharpen the roll edge angle in the future work. The micro patterning technique was applied to groove wick forming for heat spreader (sort of 2 dimensional heat pipe) which had 300 μ m total thickness and united container-wick structure. The roll forming process could be extended to cover as large area as 100x100mm². The new micro patterning method is easy and fast to perform with insignificant tool wear. Because of the characteristics a multitude of uniform grooves were obtained.

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