



PDMS 微結構滾輪壓印感應加熱方法

提案人： 楊申語 教授

單位： 國立臺灣大學 機械工程 學系/研究所

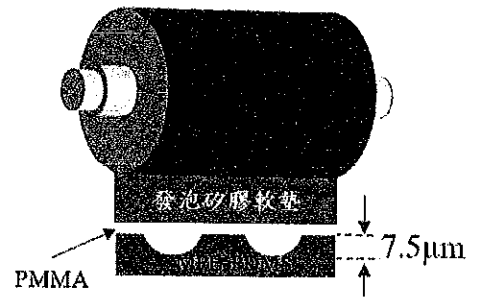
簡歷： 台大機械系-楊申語教授 (ntu.edu.tw)

臺灣大學，機械工程學士，1976

紐約雪城大學，機械工程碩士，1982

明尼蘇達大學，機械工程博士，1990

研究領域：塑膠加工、金屬成型



市場及需求：

精密為結構翻模壓印、PDMS 模具加熱技術、PDMS 模具做多重壓印技術、PDMS 凸透鏡熱壓成型技術

技術摘要(含成果)：

1. 以磁性粒子作為提升 PDMS 硬度之製程。
2. 用雙粒子以上的磁性粒子嵌入 PDMS 作為高週波感應加熱熱源及硬度提升。
3. PDMS 內部熱源直接感應加熱法做熱壓印製程。
4. PDMS 模具搭配發泡矽膠耐高溫軟墊的壓印製程。
5. 克服集膚效應而將大於 $30\ \mu\text{m}$ 以上的粒子混入 PDMS 內部作為高週波感應加熱的熱源。
6. PDMS 模具做上下雙面熱壓印，凹凸透鏡或其他微結構同時壓印。
7. PDMS 模具做 4 重堆疊壓印，雙凹雙凸透鏡或其他微結構同時壓印。
8. 使用 PDMS 模具做多重壓印。
9. 將磁性粒子加入滾筒內部之 PDMS 形成微結構。

優勢：

1. 將 PDMS 橡皮擦之硬度提升至皮鞋鞋根之硬度
2. 高週波直接感應加熱 PDMS 內部熱源熱壓印
3. PDMS 滾輪壓印出凸透鏡
4. PDMS 滾輪多重壓印

競爭產品：

1. 外部熱源間接感應加熱 PDMS 熱壓印；
2. 硬度不夠無法做滾輪壓印

專利現況：

- (1) 本技術已有相關專利 (中華民國專利申請號:XXXX; 美國專利證號:XXX)。
- (2) 本研究團隊具有數十年研究經驗...
- (3) 其他...

聯絡方式(請不用填)：

臺大產學合作總中心

Tel: 02-3366-9945, E-mail: ntuciac@ntu.edu.tw



PDMS microstructure roller embossing induction heating method

PI : Prof. Sen-Yeu Yang

Department of Mechanical Engineering, National Taiwan U.

Experience:

台大機械系-楊申語教授 (ntu.edu.tw)

B.S. in Mechanical Engineering, National Taiwan University, 1976

M.S. in Mechanical Engineering, Syracuse University, 1982

Ph.D. in Mechanical Engineering, University of Minnesota, 1990

Research Interests: Polymer processing, metal forming

Market Needs:

Precise structural reversal imprinting, PDMS mold heating technology, PDMS mold multiple imprinting technology, PDMS convex microlens hot embossing technology

Our Technology:

1. Use magnetic particles as a process to increase the hardness of PDMS.
2. Use magnetic particles with two or more particles embedded in PDMS as a high-frequency induction heating heat source and increase hardness.
3. The direct induction heating method of PDMS internal heat source is used for the hot embossing process.
4. The embossing process of PDMS mold with high-temperature resistant foamed silicone cushion.
5. To overcome the skin effect, large particles larger than $30\mu\text{m}$ are mixed into the PDMS as a heat source for high-frequency induction heating.
6. The PDMS mold is hot embossed on the upper and lower sides, and the concave-convex lens or other microstructures are simultaneously imprinted.
7. The PDMS mold is embossed with four layers of stacking, and the biconcave, biconvex lens, or other microstructures are simultaneously imprinted.
8. Use a PDMS mold to do multiple imprinting.
9. Add magnetic particles embedded in PDMS into the roller to form microstructures.

Strength:

1. Increase the hardness of the PDMS eraser to the heel of the leather shoe; 2. Direct induction heating PDMS internal heat source hot embossing; 3. The roller embosses the convex microlens. 4. PDMS roller multiple imprint

Competing Products:

1. Indirect induction heating PDMS hot embossing by external heat source; 2. The hardness is not enough to make roller embossing.

Intellectual Properties:

Contact (do not need to fill out):

Center for Industry-Academia Cooperation, NTU

Tel: 02-3366-9945, E-mail: ntuciac@ntu.edu.tw

