THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Plastic Injectable Transdermal Drug Delivery Microneedles

Drug Delivery

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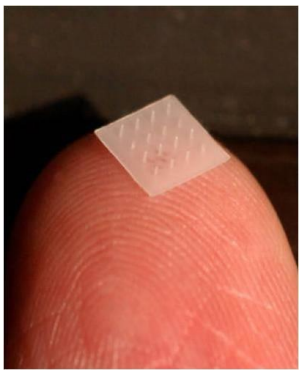
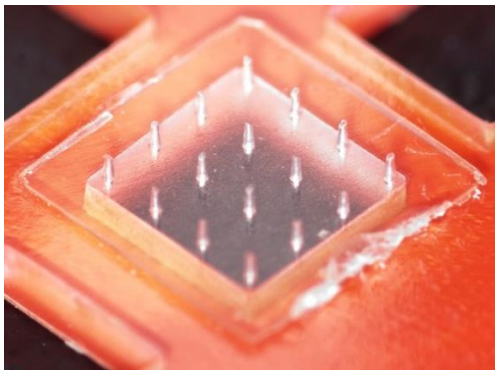
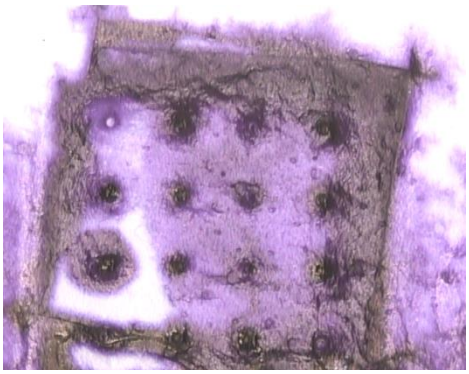
. Micro / Nano Injection Moulding Technology . Plastic Hollow Microneedle Fabrication .

Transdermal drug delivery using microneedle is a novel and promising method of drug delivery. Microneedles fabricated in micro scale is better than conventional needles as it is non-invasive, the needle tip does not touch the nerve cells which enables painless injection and precise dosage can be injected persistently. They have been used for the transdermal delivery of a broad range of drugs, such as small molecular weight drugs, oligonucleotides, DNA, peptides, proteins and vaccine. In the past decade, various types of microneedles, based on different materials, have been developed by a number of production processes. However, these processes are generally not cost effective and the production yield is not high. Therefore, until now there are no hollow microneedle-based transdermal drug delivery systems on the market. To tackle the challenge, research to fabricate plastic hollow and sharp tipped microneedles by micro injection molding has been conducted by PolyU. Since the successful application of plastic micro injection molding is frequently determined by goodness and accuracy in the design and manufacture of microneedle mould cavity, non-conventional micro fabrication methods such as photolithography, micro-electroforming and pico-second laser machining have been developed by PolyU for the fabrication of precise hollow microneedle mould structures. The latest developments of micro injection moulding technology and micro mould fabrication technique made by PolyU enabled the plastic injectable microneedles fabrication an innovative, reliable and cost effective production method.







Representative Publications

1. K L Yung, Y. Xu, C L Kang, et al., "Sharp tipped plastic hollow microneedle array by microinjection moulding", Journal of Micromechanics and Microengineering, vol. 22, no. 1, 2012.
2. K. L. Yung, et al., Target Tracking in Micro Injection Molding, Key Engineering Materials, vol. 364-366, no. 1292, 2007
3. Yan Xu, K.L. Yung, "Prediction of polymer pellet conveying behavior in microinjection molding machine", Polymer Engineering and Science, vol. 46, no. 11, 2006.

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