

Abstract

Mahmoud A. El-Sayed

Manufacturing of metallic micro components using hybrid soft lithography and micro electrical discharge machining

In spite of significant improvements in micro-replication techniques, methods to fabricate well-defined net shape microstructures are still in a developing stage. Soft-lithography has the capability to manufacture complex micro- and nanostructures. Although it is considered a robust technique, a major limitation is related to the distortion encountered in the fabricated structures during the drying process. In the present work, a manufacturing technology has been developed that emerges the benefits of Soft-Lithography and Micro Electrical Discharge Machining (μ -EDM) to produce stainless steel precise micro-components for Micro-implantable devices. The micro-parts produced by Soft-lithography were subsequently surface processed via μ -EDM in order to improve the surface quality. In addition to this, it was found that μ -EDM drastically improved the surface roughness of stainless steel micro-components from $Ra=3.4 \mu\text{m}$ to $Ra =0.43 \mu\text{m}$.