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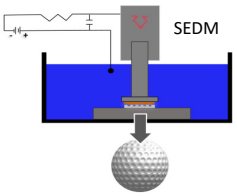
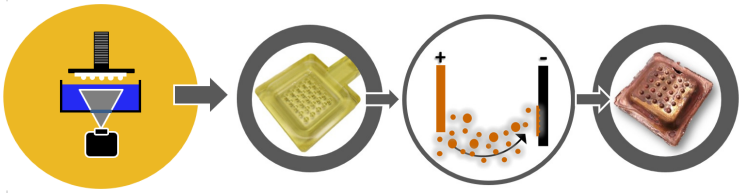
EXPERIMENTAL APPLICATION OF A LABORATORY EQUIPMENT FOR MICRO-ELECTROFORMING USING MODELS MANUFACTURED WITH ADDITIVE TECHNOLOGY.

Carlos Jesús Sánchez-Morales[1]*, María Dolores Martínez-Rivero[1], Pedro M. Hernández-Castellano[1], María Dolores Marrero-Alemán[1] and Jorge Salguero-Gómez[2]

1 Departamento de Ingeniería Mecánica, Universidad de Las Palmas de Gran Canaria, Edificio de fabricación integrada. Parque científico tecnológico ULPGC. Campus de Tafira. 35017, Las Palmas de Gran Canaria, España.
carlos.sanchez@ulpgc.es
2 Departamento de Ingeniería Mecánica y Diseño Industrial, Universidad de Cádiz. Avda. de la Universidad de Cádiz, 10. E11510 Puerto Real, Cádiz, España.

One of the manufacturing processes applications on a microscopic scale, consists in modifying parts or components´ surfaces to improve their properties (Surface texturing). Unconventional machining processes are needed to generate complex geometries, high details reproduction, and excellent finished surfaces at that scale. SEDM process could be one good option. The electrode manufacturing is one of the main drawbacks.

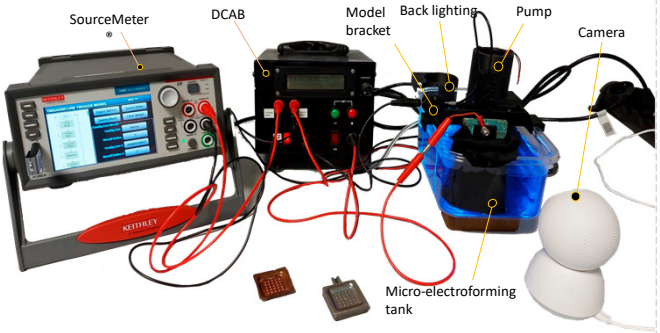


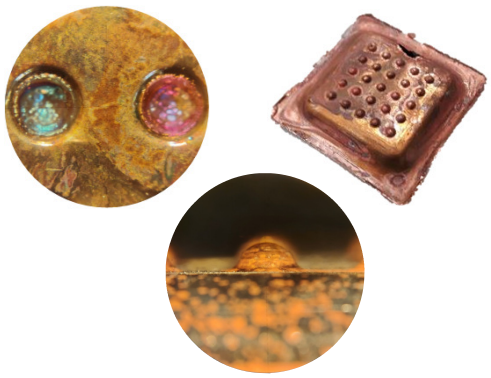


Combined use of micro-electroforming and SLA/DLP additive manufacturing is presented as a low-cost option, to obtain good results in the manufacture of SEDM electrodes.

It was necessary to develop a micro-electroforming equipment that could adapt the process parameters to the needs of the parts.
Its most innovative components are:

- Configurable power Supply: It can provide power with configurable output in voltage or amperage, and take and store readings of the electrical parameters of the process for further analysis.
- Automatic electrolytic bath agitation control device (DCAB): This device of our own design and development, manages the electrolytic bath agitation system.
- video surveillance system: It allows tracking of electrodeposition in real time by a smartphone application.





CONCLUSIONS

Combined use of additive manufacturing, sputtering and micro-electroformed processes demonstrated great potential in shaping functional surfaces for µ-SEDM.

Additive manufacturing by digital light processing (LCD/DLP) obtains high quality functional models in the reproduction of details with low-cost technology.

The developed equipment for micro-electroforming shown effective in generating copper shells with details on a micrometric scale.

The DCAB and its agitation of electrolytic bath control allowed greater uniformity in the deposited surface. Test parts reached optimal thicknesses ≥300µm.

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University of Oviedo