

Micro-Electro-Discharge Machining Method and Device



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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a micro-EDM technology that achieves high throughput micromachining.

OVERVIEW

Micro-electro-discharge machining (micro-EDM) is a microfabrication technique involving the serial discharge of electrical pulses between a microelectrode and a work piece, with a simple RC circuit controlling pulse timing. Although micro-EDM can cut any electrically conductive material (i.e., steel, graphite or silicon), its serial nature has limited its use so far.

Recently, electrode arrays have been used in place of single electrodes to allow parallel processing of work pieces and increase throughput. However, if a single, shared RC circuit is used to control pulse discharge, throughput is again hindered because only one electrode in the array can fire at any one time.

THE INVENTION

UW-Madison researchers have developed a micro-EDM technology that achieves high throughput micromachining by increasing both the spatial density of electrodes and the temporal density of electrical discharges. The device is composed of a LIGA-fabricated electrode array that sits atop a lithographically patterned thin film interconnect. The array achieves spatial parallelism in machining, while a pulse generation scheme exploiting the parasitic capacitance of the interconnect allows simultaneous discharge of electrodes to provide temporal parallelism.

APPLICATIONS

- High throughput micro-EDM

KEY BENEFITS

THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.



- Achieves high parallelism and high throughput
- Offers a 100-fold increase in machining rate over conventional EDM
- Highly amenable to large-scale electrode arrays, due to tight integration of all pulse control circuit elements
- Provides more precise cutting and a smoother machined surface

ADDITIONAL INFORMATION

Publications

Takahata K. and Gianchandani Y. B. 2002. Batch Mode Micro-Electro-Discharge Machining. J. Microelectromech. Syst. 11, 102-110.

Tech Fields

Micro & Nanotech - Micromachining

CONTACT INFORMATION

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