Micro-EDM of nonconducting ceramics

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Project Details – nonconductive ceramic micro EDM

Project coordinator	Chemnitz University of Technology
Other applicants	Fraunhofer IWU Chemnitz
Sector	micromanufacturing, medical, tool makers, users of engineered materials
Call of Interest	☑ CORNET ☑ EraSME
Proposal summary:	Implementation of micro-electro discharge machining (µEDM) of industrially used nonconductive ceramics (zirconia, alumina..) by using new process approach
Advantages for SMEs, trade or industry:	- new possibilities for machining very hard ceramics with high precision micro features of high aspect ratio - new materials for tool makers etc.; microstructured biocompatible materials for implants; ...
Profile of partners sought:	- end users of engineered high end ceramics - tool makers wishing to broaden their machinable material range

- ceramic material properties
  - high hardness
  - temperature stability
  - biocompatibility
- machining of ceramics
  - milling processes in green and white state
    - significant shrinkage during sintering has to be considered
  - grinding and lapping processes in sintered / hard state
    - slow
    - expensive grinding tools
    - limitation in achievable aspect ratio for micro structures
- **benefits of EDM**
  - **nearly forceless**
  - **independent of material hardness and brittleness**
- **<u>BUT needs electrically conductive material</u>**

- current situation
  - approach verified
  - machining possible
- project target
  - putting process to production
  - increasing material range
  - increasing speed
  - increasing accuracy
  - understanding principles behind
- participating actors
  - users of ceramics to define target geometry
  - users of EDM to test and implement strategies
  - researchers to optimise process
- duration and cost
  - 1..3 years project

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