# earch and Economic Development

**OTC Website** 

**Find Technologies** 

Permalink

**Request Information** 

## Innovative Ceramic Etching Technique

Tech ID: 24352 / UC Case 2014-174-0

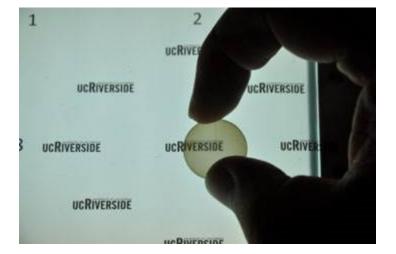
### **PATENT STATUS**

CountryTypeNumberDatedCaseUnited States Of AmericaIssued Patent9,535,19201/03/20172014-174FULL DESCRIPTIONBackgroundVaveguides in optical media are an essential part of a wide variety of important optical devices. Ceramics offer high temperature and chemictability and relatively efficient fabrication compared to glasses and single crystals thus promising to increase the application space for opticalnaterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. Aotential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that isuecessary to induce permanent optical changes in ceramics i.e., for waveguide writing.
FULL DESCRIPTION Background Vaveguides in optical media are an essential part of a wide variety of important optical devices. Ceramics offer high temperature and chemic tability and relatively efficient fabrication compared to glasses and single crystals thus promising to increase the application space for optical naterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. A potential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
Background Vaveguides in optical media are an essential part of a wide variety of important optical devices. Ceramics offer high temperature and chemic tability and relatively efficient fabrication compared to glasses and single crystals thus promising to increase the application space for optical naterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. A potential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
Background Vaveguides in optical media are an essential part of a wide variety of important optical devices. Ceramics offer high temperature and chemic tability and relatively efficient fabrication compared to glasses and single crystals thus promising to increase the application space for optical naterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. A potential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
Background Vaveguides in optical media are an essential part of a wide variety of important optical devices. Ceramics offer high temperature and chemic tability and relatively efficient fabrication compared to glasses and single crystals thus promising to increase the application space for optical naterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. A potential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
Vaveguides in optical media are an essential part of a wide variety of important optical devices. Ceramics offer high temperature and chemic tability and relatively efficient fabrication compared to glasses and single crystals thus promising to increase the application space for optical naterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. A potential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
tability and relatively efficient fabrication compared to glasses and single crystals thus promising to increase the application space for optical naterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. A potential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
naterials. These advantages have prompted investigations and various successful demonstrations of waveguide written in ceramics. A potential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
ential drawback to the widespread application of waveguide structures in ceramic-based devices is the relatively high power that is
cessary to induce permanent optical changes in ceramics i.e., for waveguide writing.
to induce pointanent optical changes in columnes net, for tha regulate whiling.

#### Technology

The invention is a method for writing waveguides in transparent polycrystalline ceramics using femtosecond laser pulses with remarkably low Medical energy of 5nJ. The energy used for writing these waveguide-like structures is at least three or four orders of magnitude lower than earlier reported for ceramics. The inventors have demonstrated the use of this technique in writing waveguide like structures in optically transparent Ytrria Stabilized Zirconia (YSZ) ceramics.

The low energy requirements for writing waveguides should make these optical ceramics more cooperative, efficient, and economical to industrial applications and their integration in devices.



Transparent Ytria Stabilized Zirconia

CONTACT

#### Venkata S. Krishnamurty venkata.krishnamurty@ucr.edu tel: .

#### MATION

ilized ceramics,

biomedical

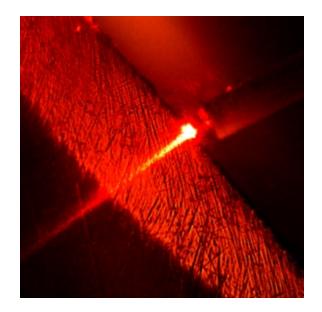
alline ceramics, low

erials

- Photonics
- and Photonics
  - Engineering
- ► Imaging
- Materials & Chemicals
  - Ceramics
- Medical
  - Devices
  - Diagnostics
  - ► Research Tools

**RELATED CASES** 

2014-174-0



Light confinement in a waveguide like structure

#### **BENEFITS**

- ▶ Lowest energy for the successful writing of waveguide like structures in a ceramic material
- Low temperature process
- Chemical stability
- Efficient fabrication.

#### **APPLICATIONS**

Optical materials

**Biomedical implants** 

#### **RELATED MATERIALS**

▶ Waveguide-like structures written in transparent polycrystalline ceramics with an ultra-low fluence femtosecond laser

University of California, Riverside Office of Technology Commercialization 200 University Office Building, Riverside,CA 92521 otc@ucr.edu https://research.ucr.edu/

Terms of use | Privacy Notice | © 2014 - 2022, The Regents of the University of California