Method to Fabricate Josephson Junctions

Tech ID: 25462 / UC Case 2014-265-0

TECHNOLOGY DESCRIPTION

University researchers have developed Josephson junctions and superconducting tunneling devices based on copper-oxide high-transition-temperature superconductors (HTS), and methods to fabricate the same. The invention presents very high-quality all-HTS Josephson superconducting tunnel junctions, arrays and superconducting quantum interference devices created by using a focused beam of helium ions to direct-write insulating barriers into $YBa_2Cu_3O_{7-\delta}$ (YBCO) thin films. The invention's technique allows tuning of the tunneling junction characteristics and enables reproducible production of superconducting tunneling devices which can operate at easily accessible temperatures. The invention has potential for far reaching impact on applications of superconducting electronics, from highly sensitive magnetometers for biomagnetic measurements of the human body, to large scale arrays for wideband satellite communications.

RELATED MATERIALS

- Fabricating inexpensive, high-temp SQUIDs: Discovery paves way for new kinds of superconducting electronics - 06/22/2015
- Discovery Paves Way for New Kinds of Superconducting Electronics - 06/22/2015
- YBa2Cu3O7d Superconducting Quantum Interference Devices with metallic to insulating barriers written with a focused helium ion beam," Applied Physics Letters 106, 252601 (2015); - 06/22/2015

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,224,475	03/05/2019	2014-265
United States Of America	Published Application	2019/028817	09/19/2019	2014-265

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OTHER INFORMATION

KEYWORDS

HTS, high temperature supeconductors, YBCO, Josephson Junction, superconducting electronics, focused ion beam

CATEGORIZED AS

- **Materials & Chemicals**
  - Superconductors
- **Nanotechnology**
  - Electronics
  - Tools and Devices

RELATED CASES

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