US 20220385262A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2022/0385262 A1**

Ryder et al. (43) **Pub. Date: Dec. 1, 2022**

(54) **ACOUSTIC RESONATOR DEVICE WITH CONTROLLED PLACEMENT OF FUNCTIONALIZATION MATERIAL**

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(21) Appl. No.: **17/884,888**

(22) Filed: **Aug. 10, 2022**

Related U.S. Application Data

(63) Continuation of application No. 15/334,459, filed on Oct. 26, 2016, now Pat. No. 11,444,595.

(60) Provisional application No. 62/373,668, filed on Aug. 11, 2016.

Publication Classification

(51) **Int. Cl.**

H03H 9/02	(2006.01)
G01N 29/02	(2006.01)
G01N 29/036	(2006.01)
G01N 33/536	(2006.01)
H03H 3/02	(2006.01)
H03H 9/13	(2006.01)
H03H 9/17	(2006.01)

(52) **U.S. Cl.**

CPC ***H03H 9/02015*** (2013.01); ***G01N 29/022*** (2013.01); ***G01N 29/036*** (2013.01); ***G01N 33/536*** (2013.01); ***H03H 3/02*** (2013.01); ***H03H 9/131*** (2013.01); ***H03H 9/175*** (2013.01); *G01N 2291/0256* (2013.01); *G01N 2291/0426* (2013.01); *G01N 2291/0255* (2013.01); *H03H 2003/027* (2013.01); *H03H 2009/155* (2013.01)

(57) **ABSTRACT**

A micro-electrical-mechanical system (MEMS) resonator device includes at least one functionalization material arranged over at least a central portion, but less than an entirety, of a top side electrode. For an active region exhibiting greatest sensitivity at a center point and reduced sensitivity along its periphery, omitting functionalization material over at least one peripheral portion of a resonator active region prevents analyte binding in regions of lowest sensitivity. The at least one functionalization material extends a maximum length in a range of from about 20% to about 95% of an active area length and extends a maximum width in a range of from about 50% to 100% of an active area width. Methods for fabricating MEMS resonator devices are also provided.