US 20140084450A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2014/0084450 A1

(43) Pub. Date: Mar. 27, 2014

Nielson et al.

(54) **PROCESSES FOR MULTI-LAYER DEVICES UTILIZING LAYER TRANSFER**

(71) Applicant: **Sandia Corporation**, (US)

(72) Inventors: **Gregory N. Nielson**, Albuquerque, NM (US); **Carlos Anthony Sanchez**, Belen, NM (US); **Anna Tauke-Pedretti**, Albuquerque, NM (US); **Bongsang Kim**, Albuquerque, NM (US); **Jeffrey Cederberg**, Albuquerque, NM (US); **Murat Okandan**, Edgewood, NM (US); **Jose Luis Cruz-Campa**, Albuquerque, NM (US); **Paul J. Resnick**, Albuquerque, NM (US)

(73) Assignee: **Sandia Corporation**, Albuquerque, NM (US)

(21) Appl. No.: **13/627,425**

(22) Filed: **Sep. 26, 2012**

Publication Classification

(51) **Int. Cl.**
H01L 23/48 (2006.01)
H01L 21/50 (2006.01)

(52) **U.S. Cl.**
USPC **257/734**; 438/107; 257/E21.499; 257/E23.01

(57) **ABSTRACT**

A method includes forming a release layer over a donor substrate. A plurality of devices made of a first semiconductor material are formed over the release layer. A first dielectric layer is formed over the plurality of devices such that all exposed surfaces of the plurality of devices are covered by the first dielectric layer. The plurality of devices are chemically attached to a receiving device made of a second semiconductor material different than the first semiconductor material, the receiving device having a receiving substrate attached to a surface of the receiving device opposite the plurality of devices. The release layer is etched to release the donor substrate from the plurality of devices. A second dielectric layer is applied over the plurality of devices and the receiving device to mechanically attach the plurality of devices to the receiving device.