

# (19) United States

## (12) Patent Application Publication (10) Pub. No.: US 2023/0232608 A1 KO et al.

Jul. 20, 2023 (43) **Pub. Date:** 

## (54) EPITAXIAL WAFER, METHOD OF MANUFACTURING THE EPITAXIAL WAFER, AND METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE USING THE EPITAXIAL WAFER

(71) Applicant: INDUSTRY-ACADEMIC COOPERTION FOUNDATION YONSEI UNIVERSITY, Seoul (KR)

(72) Inventors: **Dae Hong KO**, Goyang-si (KR); **Dong** Chan SEO, Seoul (KR); Choong Hee CHO, Seoul (KR); Ki Seok LEE, Seoul (KR)

(21) Appl. No.: 18/059,311

Filed: (22)Nov. 28, 2022

#### (30)Foreign Application Priority Data

Nov. 26, 2021	(KR)	10-2021-0165619
May 27, 2022	(KR)	10-2022-0065411
Nov. 24, 2022	(KR)	10-2022-0158899

### **Publication Classification**

(51)	Int. Cl.	
	H10B 12/00	(2006.01)
	H01L 21/02	(2006.01)
	H01L 21/306	(2006.01)
	H01L 21/3065	(2006.01)

(52) U.S. Cl. CPC ....... H10B 12/05 (2023.02); H01L 21/0245 (2013.01); H01L 21/02532 (2013.01); H01L 21/02576 (2013.01); H01L 21/02579 (2013.01); H01L 21/0262 (2013.01); H01L 21/30604 (2013.01); H01L 21/3065 (2013.01); H01L 21/02381 (2013.01)

#### (57) **ABSTRACT**

## [summary]

An epitaxial wafer is disclosed. The epitaxial wafer includes a substrate; and a stack disposed on the substrate, wherein the stack includes silicon (Si) layers and silicon germanium (SiGe) layers alternately stacked on top of each other, wherein the silicon germanium layer is doped with boron (B) or phosphorus (P).

