

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2024/0213303 A1 PARK et al.

Jun. 27, 2024 (43) **Pub. Date:**

(54) CAPACITOR, SEMICONDUCTOR DEVICE INCLUDING THE SAME AND ELECTRONIC **APPARATUS**

(71) Applicant: Samsung Electronics Co., Ltd.,

Suwon-si (KR)

(72) Inventors: Boeun PARK, Suwon-si (KR);

Haeryong KIM, Suwon-si (KR); Euncheol DO, Suwon-si (KR); Cheheung KIM, Suwon-si (KR); Jooho LEE, Suwon-si (KR)

(73) Assignee: Samsung Electronics Co., Ltd.,

Suwon-si (KR)

(21) Appl. No.: 18/347,938

(22)Filed: Jul. 6, 2023

(30)Foreign Application Priority Data

Dec. 23, 2022 (KR) 10-2022-0183215

Publication Classification

(51) Int. Cl.

H01G 4/08 (2006.01)H01G 4/33 (2006.01) H01L 29/51 (2006.01)H01L 29/94 (2006.01)H10B 12/00 (2023.01)H01G 4/008 (2006.01)

(52) U.S. Cl.

CPC H01L 28/56 (2013.01); H01G 4/085 (2013.01); H01G 4/33 (2013.01); H01L 29/511 (2013.01); H01L 29/517 (2013.01); H01L 29/518 (2013.01); H01L 29/94 (2013.01); H10B 12/31 (2023.02); H01G 4/008 (2013.01)

(57)ABSTRACT

Provided is a capacitor, a semiconductor device including the same, and an electronic apparatus including the semiconductor device, wherein the capacitor includes a first electrode including a first metal ion, a second electrode arranged spaced apart from the first electrode, a dielectric layer provided between the first electrode and the second electrode, and an interfacial layer provided between the first electrode and the dielectric layer and including a compound represented by $M_xO_vN_z$, in which a diffusion energy barrier value of M is equal to or greater than a diffusion energy barrier value of the first metal ion.

