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### (54) SEMICONDUCTOR DEVICE AND FABRICATING METHOD THEREOF

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

The present disclosure provides a semiconductor device and a fabricating method thereof, and the semiconductor device includes a substrate, a capacitor structure, a supporting structure and a supplementary layer. The capacitor structure is disposed on the substrate, and includes a plurality of columnar bottom electrodes, a capacitor dielectric layer, and a top electrode layer. The supporting structure is disposed between adjacent ones of the columnar bottom electrodes, and the supporting structure includes a first supporting layer and a second supporting layer stacked from bottom to top. The supplementary layer is disposed between each of the columnar bottom electrodes and the supporting structure, to directly in contact with the first supporting layer, the second supporting layer, and sidewalls of the columnar bottom electrodes.

