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(54) **GATE-ALL-AROUND DEVICE WITH DIFFERENT CHANNEL SEMICONDUCTOR MATERIALS AND METHOD OF FORMING THE SAME**

(71) Applicant: **Taiwan Semiconductor Manufacturing Co., Ltd.**, Hsin-Chu (TW)

(72) Inventors: **Jhe-Ching Lu**, Tainan City (TW);
Yen-Sen Wang, Hsinchu County (TW);
Bao-Ru Young, Hsinchu County (TW);
Tsung-Chieh Tsai, Hsin-Chu County (TW)

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(57) **ABSTRACT**

Semiconductor device and the manufacturing method thereof are disclosed. An exemplary method comprises forming a first semiconductor layer including a first semiconductor material in a first area of a substrate; alternately depositing second semiconductor layers and third semiconductor layers over the first semiconductor layer and over the substrate to form a semiconductor layer stack, wherein the second semiconductor layers include a second semiconductor material, the third semiconductor layers include the first semiconductor material, the second semiconductor material is different from the first semiconductor material, and a bottom surface of one of the second semiconductor layers contacts the first semiconductor layer in the first area and contacts the substrate in a second area of the substrate; planarizing a top surface of the semiconductor layer stack; and patterning the semiconductor layer stack to form a first semiconductor structure in the first area and a second semiconductor structure in the second area.

