



US 20230230918A1

(19) **United States**(12) **Patent Application Publication**  
**HUANG**(10) **Pub. No.: US 2023/0230918 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **METHOD FOR PREPARING  
SEMICONDUCTOR DEVICE WITH  
COPPER-MANGANESE LINER**(52) **U.S. CL.**  
CPC .... **H01L 23/5256** (2013.01); **H01L 23/53238**  
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(TW)(57) **ABSTRACT**(72) Inventor: **CHIN-LING HUANG**, TAOYUAN  
CITY (TW)(21) Appl. No.: **18/124,748**(22) Filed: **Mar. 22, 2023****Related U.S. Application Data**(62) Division of application No. 17/240,287, filed on Apr.  
26, 2021, now Pat. No. 11,658,115.**Publication Classification**(51) **Int. Cl.**  
**H01L 23/525** (2006.01)  
**H01L 23/532** (2006.01)

The present disclosure provides a method for preparing a semiconductor device with a copper-manganese liner. The method includes forming an opening structure in a first dielectric layer, wherein the opening structure has a first portion, a second portion and a third portion disposed between and physically connecting the first portion and the second portion; forming a lining material lining the first portion and the second portion of the opening structure and completely filling the third portion of the opening structure, wherein the lining material includes copper-manganese (CuMn); filling the first portion and the second portion of the opening structure with a conductive material after the lining material is formed; and performing a planarization process on the lining material and the conductive material.

