

課題番号 : F-17-UT-0161  
 利用形態 : 機器利用  
 利用課題名(日本語) : 実装工学における接合研究(水素ラジカル)  
 Program Title (English) : Study on Bonding in Packaging Technology (Hydrogen Radical)  
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### 1. 概要(Summary)

Hydrogen radical and fast atom beam (FAB) treatments were used to remove the oxide layer of copper metal. Successful removal of the oxide layer was detected via X-ray photoelectron spectroscopy (XPS), where the visible color change of copper has occurred after the treatment. Re-oxidation status has been measured to analyze the trends for each removal treatment.

### 2. 実験(Experimental)

#### 【利用した主な装置】

ブレードダイサー(DAD3650)

#### 【実験方法】

2-Inch sized copper-plated wafer was diced using the dicing machine provided by the Takeda cleanroom. The model of DAD3650 was used to cut the wafer into 1cm x 1cm sizes.

Each chip was then exposed to two different pretreatments (Fast Atom beam and Hydrogen radical treatment). The removal of oxide layers was checked, then placed them to the ambient air to see the trends in re-oxidation.

### 3. 結果と考察(Results and Discussion)

The samples were exposed to the air atmosphere to evaluate the re-oxidation behavior after the treatments. Compared to FAB treatment, suppression of the copper oxidation was found after the hydrogen radical treatment.

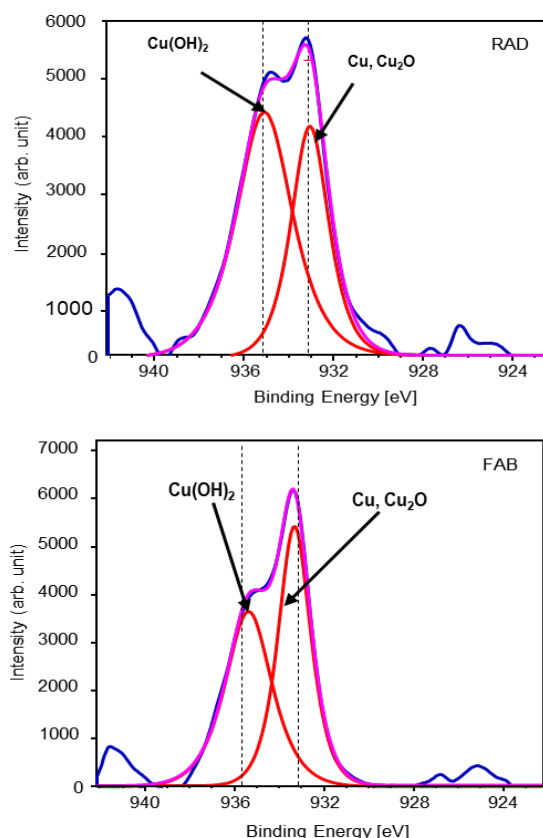


Figure 1 XPS Cu main peak after 48 hours of exposure. a) Hydrogen radical treatment b) FAB

### 4. その他・特記事項(Others)

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## 5. 論文・学会発表(Publication/Presentation)

- [1] S. Shin, E. Higurashi, K. Furuyama, and T. Suga, Hydrogen radical treatment for suppression of oxidation and contamination at copper surfaces, The 8th Japan-China-Korea MEMS/NEMS with NANO KOREA 2017, pp. 24-25, Kintex, Korea, July 13-15 (2017).
- [2] S. Shin, E. Higurashi, K. Furuyama, and T. Suga, Hydrogen radical treatment for suppression of oxidation and contamination at copper surfaces, 第 34 回「センサ・マイクロマシンと応用システム」シンポジウム, 01am1-A-6, 広島国際会議場, 2017 年 10 月 31 日～11 月 2 日, 奨励賞.

## 6. 関連特許(Patent)

なし