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# Effect of ruthenium on oxidation behaviour of copper interconnect

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## Abstract content <br>   (Max 300 words)

In the semiconductor electronics industry, the essential requirements of interconnects among all types of components in all electronic systems remain unchanged because the component need to be electrically connected for power, ground and signal transmission. Copper interconnections are widely used in the electronic industry. They provide the conductive path required to achieve connection from one circuit element to another. However, the applications of copper interconnection have been limited by the oxidation of copper. Copper oxidation appears in the interface of Cu interconnection and contact pad at elevated temperature and humidity. The resultant effects of Cu interconnection oxidation are cracks, decrease in the interfacial shear strength and poor bonding between the component and the substrate which causes device failure. Hence, knowledge in and understanding of the oxidation behaviour as well as diffusion mechanism of copper-based interconnect is important. Ruthenium has been observed as suitable material due to its oxidation resistance and low bulk resistivity. This study seeks to investigate the effect of ruthenium on oxidation behaviour of copper interconnects material using powder metallurgical technique. The Copper-ruthenium composites were sintered using hot press. The morphology and microstructure of the sintered materials will be characterized by SEM/EDS as well as XRD analysis. The Thermogravimetric analysis (TGA) will be employed to investigate the weight gain by copper and copper-ruthenium composites due to oxidation. The weight gain will be used to calculate the activation energy of the composites. The XRD will be used to identify phase changes due to oxidation. The surface analysis of the sample will be carried out using AES to measure the oxidation thickness at different temperature.

Key words: Copper composites, powder metallurgy and oxidation behaviour

## Apply to be<br> consider for a student <br>   award (Yes / No)?

Yes

## Level for award<br> (Hons, MSc, <br>   PhD)?

PhD

## Main supervisor (name and email)<br>and his / her institution

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## Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

Yes

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