

Adsorption of Polyethylene Glycol molecules on electrodeposited copper surfaces

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Polyethylene Glycol(PEG) molecules of 7500 in molecular weight adsorbs on the electrodeposited copper surfaces. We observed these molecules as about 30nm diameter molecules(Fig.1, See reference 1). We confirmed these molecules as PEG because their diameters shrink with smaller molecular weights of 1000. Also, the combustion analysis of electrodeposited film showed ten times carbon and three times oxygen, if compared with the electrodeposited film from PEG free electrolyte.

Figure 2 shows the secondary electron image and mapping analysis of oxygen with field emission Auger. Numerous 30nm PEG molecules are observed at the center of the secondary electron image (Fig.2 a, see arrow). The mapping analysis of b shows high oxygen portion at the center and this localized high oxygen portion exactly corresponds to the location of PEG molecules in the secondary electron image of a.

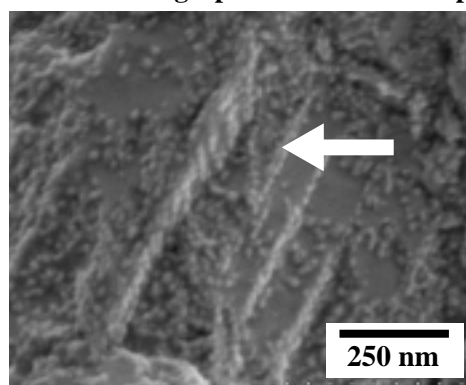
Figure 3 again shows the 30nm PEG molecules adsorb on the electrodeposited surface. The electrodeposit, in this case, has been prepared from the PEG and Chloride free electrolyte. The electrodeposit was the dipped, not electrodeposited, into the PEG and Chloride containing electrolyte. The electrodeposit surface again is covered by absorbed 30nm PEG molecules.

These 30nm PEG molecules are only observed after several ten minutes of electrodeposition or dipping with PEG and Chloride containing electrolyte. The Quartz Crystal Microbalance (QCM) and Bis (3-sulphopropyl disulfide (SPS) effects will also be discussed with respect to the PEG molecule observation at the meeting.

References

1.'Role of damascene via filling additives-morphology evolution',Kazuo Kondo,etal.ECS Proc.Vol.2000-8.p76(2002).

Fig.1 SEM micrograph of the electrodeposit with



PEG and Chloride containing electrolyte.

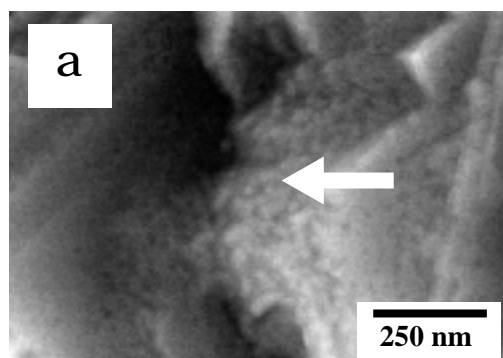
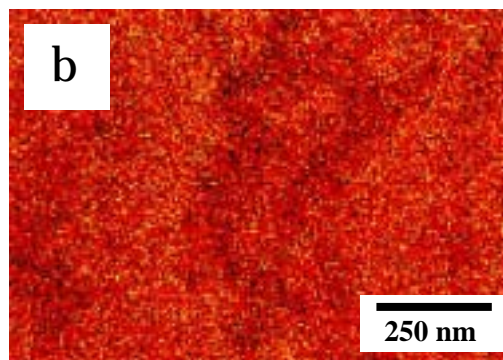


Fig.2 Secondary electron image and Oxygen Auger



of the electrodeposit with PEG and Chloride. a)Secondary electron image, b)Field emission Auger with Oxygen.

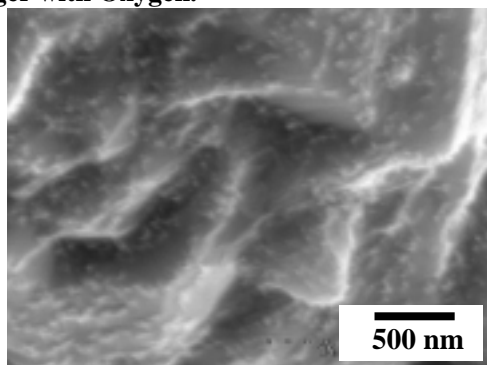


Fig.3 SEM micrograph of the electrodeposit. The electrodeposit from PEG and Chloride free electrolyte was dipped in the PEG and Chloride containing electrolyte.