The effects of amine-content in cleaning solutions on the residue removal of Cu interconnection

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As device features scale down to 90nm and Cu/low-k films are employed for back end interconnects, post etch and ash residue cleaning becomes an increased challenge due to the higher aspect ratio of the features, tighter CD control requirements and sensitivity of the low-k films. Many commercially available cleaning solutions have been composed of organic solvents, water, low concentrations of active species, and buffering agents to control chemical activity.
In this study, amine-containing solution was applied to remove of copper post-etch residue (PER). In order to remove of Cu PER, temperature(25~55℃), pH(2~12), and concentration (1~15wt%) of amine component were examined. The result of the removal of Cu PER was characterized by using ICP, AFM, and FESEM. As the temperature and process time increased, the cleaning ability such as solubility and selectivity increased.