應用超臨界二氧化碳清除蝕刻後殘餘污染物之研究

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摘　　要

超臨界流體是一種先進的環保技術，可以減少溶劑與水的使用量，同時具有低表面張力、低黏度、高擴散性等獨特性質。當半導體元件的尺寸進入奈米等級後，將會面臨高深寬比結構，及材料特徵所導致的技術瓶頸，而超臨界流體技術對此均有很好的解決能力。

本研究的最終目的是研究超臨界二氧化碳與 co-solvent 去除蝕刻後的光阻及其殘餘污染物，分三個階段進行，第一階段為硬烤後的光阻去除，第二階段為離子植入製程後的光阻去除，第三階段為蝕刻製程後的光阻去除。

光阻的去除是利用昇降壓的動作使光阻與底材剝離，再以足夠的液體流量，將已膨脹、剝離的光阻移除，最後利用臨界二氧化碳將殘餘的 co-solvent 移除，以達到乾燥的目的。所以超臨界二氧化碳的光阻去除製程是一種 ”乾進－乾出 ”的製程。

Research on the removal of post-etch residues useing supercritical carbon dioxide

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ABSTRACT

The supercritical fluid cleaning technology has also the environmental benefits of dramatically reducing the amount of solvent and water used. Supercritical fluids have transport properties similar to gases and solvating properties similar to liquids, as well as low surface tension. As semiconductor device dimensions approach the nanoscale, it will become increasingly difficult to use aqueous-based cleaning process. Supercritical fluids provide the enabling capabilities for overcoming the process barriers encountered.

The final purpose is studing the removal of post-etch residues using supercritical CO_2. We will devide the experiment into three stages. The first stage, removal of photoresist after hard-bake process. The second stage, removal of photoresist after ion implantation process. The third stage, removal of photoresist and residue after etching process.