微影製程之疊對回授控制

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摘 要

近年來隨著產業轉變的需求，半導體已成為台灣一項主要的產業，各種製程的改善也是急需迫切的，當關鍵尺寸逐漸縮小時，微影技術就更凸顯重要；當上一層與下一層曝光成像圖案層間有定位誤差時，就會產生疊對誤差。 本研究首先探討疊對誤差之來源，可分為Interfield與Intrafield兩種，分析各個誤差係數所造成的原因與物理意義，並透過幾何圖表示，瞭解到各參數在圖形上的變化情況，以做為分析上的考量。一般文獻上在探討疊對誤差參數時，皆以最小平方法來計算其參數，然而當疊對誤差模型只考慮某些項時，其忽略估測項卻會影響參數估測的準確性，而本文研究的方法是將疊對誤差模型的分成可控制的參數項與不可控制的參數項，利用Lagrange的方法找出不可控制參數項的最大值，也就是找出整個不可控制項所能產生最大可能的誤差，進而再估出可控制項的參數，並與最小平方法作一比較。 最後，由實際製程中量測機台所得到的數據資料，將其方法應用在實際例子上，以估測出區域的參數值與全域的參數值，透過兩者之間的比較，以瞭解整片晶圓曝光的情況，以作為幫助工程師的判斷，而達到改善製程品質、提昇設備總體效能的目標。

關鍵詞 : 疊對誤差 ; 最小平方 ; Lagrange

目錄

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