近接場光学を用いたナノインプリントのための膜厚測定

Measurement of Thin Film Thickness for Nano-Imprint Lithography Based on Near-Field Optics

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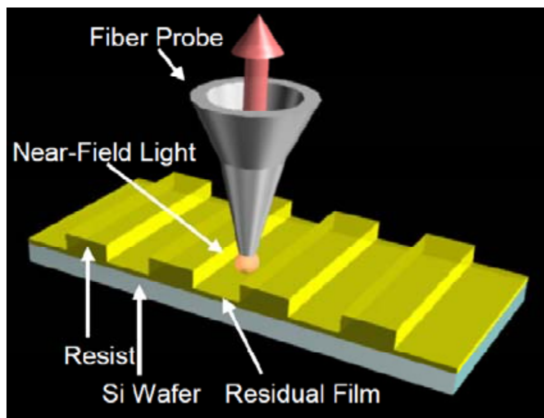
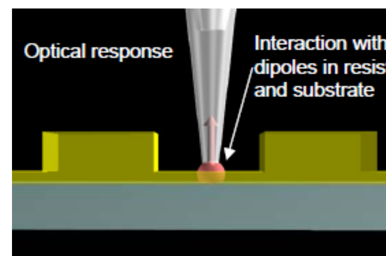
Introduction

100 nm 以下の残膜の膜厚測定は，次世代の半導体露光技術であるナノインプリントリソグラフィの実現において重要な役割を持つ．近接場光学を利用した薄膜の膜厚測定手法の開発を行う．

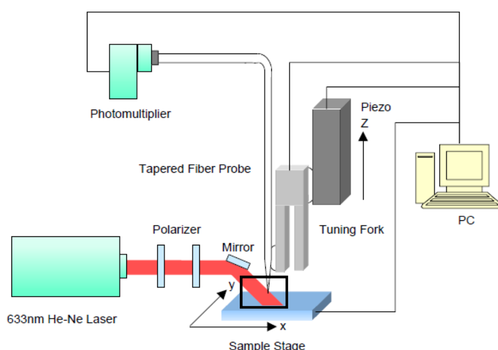
Measurement principle based on near-field optics

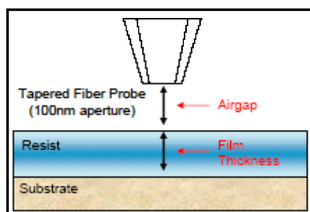




We have proposed a new measurement method based on near-field optics.

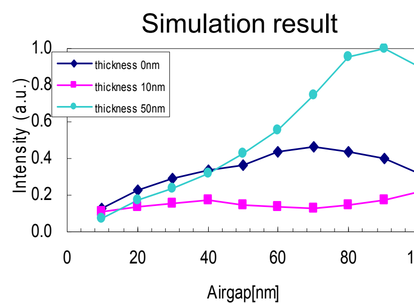
Analysis of near-field optical response



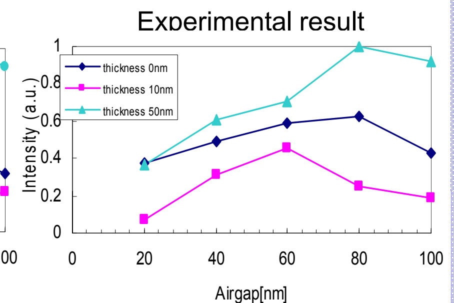


Schematic of experimental set up

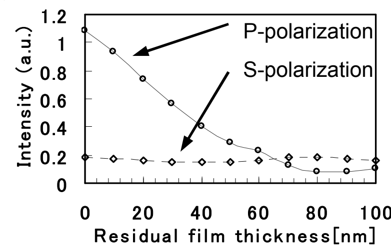
Simulation result



Experimental result



Relation between near-field optical responses and airgap when film thicknesses are 0.10. 50nm



An example to evaluate the film thickness

Our study revealed that near-field optical responses change upon film thickness and distance to the sample surface. Moreover,it is possible to measure the thin film thickness below 80nm with the resolution about a few nm.

Ref.)S.Minamiguchi, T.Nakao, S.Usuki, S.Takahashi, K.Takamasu JSPE annual meeting in autumn, 187-188, (2006)