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Hough Transform as a quality test tool for electron beam lithography

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Abstract

In this study we use Hough Transform as a test tool to investigate the quality of the electron beam lithography. A graphene like thin film of metal layer is fabricated on top of GaAs substrate by electron beam lithography. Hough Transform is applied to the SEM images of the fabricated pattern and the quality of the lithography process is quantitatively investigated. All the existing critical dimensional measurements on the SEM images which would otherwise take several days are done in a single step. The power and potential use of Hough transform for the SEM image inspection especially for the quality test of nano patterning processes is demonstrated.

Keywords: Electron beam lithography, Hough transform, Critical dimensional measurements

1. Introduction

Statement of the Problem. Demand for the complicated nano patterns continuously increases. On one side the feature size gets smaller and on the other side similar features are patterned over a larger area. Electron beam lithography is a widely used tool for preparation of such complicated nano patterns. However, as the features get smaller and denser over a large area it becomes more difficult to obtain desired pattern by electron beam lithography. Series of problem arise

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