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M. Calaon[1], H.N. Hansen[1], G. Tosello[1], J. Weirich[2], J. Garnaes[3], P.T. Tang[4]

[1]Department of Mechanical Engineering, Technical University of Denmark

[2]NKT Photonics, Denmark

[3]DFM, Danish Fundamental Metrology, Denmark

[4]IPU, Denmark

Corresponding author: M. Calaon: mcal@mek.dtu.dk

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Abstract

The present investigation addresses one of the key challenges in the product quality control of transparent polymer substrates, identified in the replication fidelity of sub-µm structures over large area. Additionally the work contributes to the development of new techniques focused on in-line characterization of large nanostructured surfaces. In particular the aim of the present paper is to introduce initial development of a metrology approach to quantify the replication fidelity of produced 500 nm diameter semi-spheres via anodizing of aluminum (Al) and subsequent nickel electroforming to COC injection molded polymer parts. Calibrated AFM measurements were used to develop a model based on scalar diffraction theory able to calculate the expected nickel and COC substrates angular distribution of reflected and transmitted intensity respectively.