

## Investigation of Photolithography Process on SPOs for the ATHENA Mission - DTU Orbit (08/11/2017)

### Investigation of Photolithography Process on SPOs for the ATHENA Mission

As part of the ongoing effort to optimize the throughput of the Athena optics we have produced mirrors with a state-of-the-art cleaning process. We report on the studies related to the importance of the photolithographic process. Pre-coating characterization of the mirrors has shown and still shows photoresist remnants on the SiO<sub>2</sub>- rib bonding zones, which influences the quality of the metallic coating and ultimately the mirror performance. The size of the photoresist remnants is on the order of 10 nm which is about half the thickness of final metallic coating. An improved photoresist process has been developed including cleaning with O<sub>2</sub> plasma in order to remove the remaining photoresist remnants prior to coating. Surface roughness results indicate that the SiO<sub>2</sub>-rib bonding zones are as clean as before the photolithography process is performed.

### General information

State: Published

Organisations: National Space Institute, Astrophysics, ESTEC, Cosine Science and Computing B.V.

Authors: Massahi, S. (Intern), Girou, D. A. (Intern), Ferreira, D. D. M. (Intern), Christensen, F. E. (Intern), Jakobsen, A. C. (Intern), Shortt, B. (Ekstern), Collon, M. (Ekstern), Landgraf, B. (Ekstern)

Publication date: 2015

### Host publication information

Title of host publication: Proceedings of SPIE

Volume: 9603

Publisher: SPIE - International Society for Optical Engineering

Article number: 96030M

Series: Proceedings of SPIE, the International Society for Optical Engineering

Volume: 9603

ISSN: 0277-786X

Main Research Area: Technical/natural sciences

Conference: Optics for EUV, X-Ray, and Gamma-Ray Astronomy VII, San Diego, United States, 10/08/2015 - 10/08/2015  
Athena, Silicon Pore Optics (SPO), AFM, SEM, Photoresist, Surface Roughness, Photolithography Process, O<sub>2</sub> Plasma, Stacking

Electronic versions:

96030M.pdf

DOIs:

10.1117/12.2186810

### Bibliographical note

Copyright 2015 Society of Photo Optical Instrumentation Engineers. One print or electronic copy may be made for personal use only. Systematic electronic or print reproduction and distribution, duplication of any material in this paper for a fee or for commercial purposes, or modification of the content of the paper are prohibited.

Publication: Research - peer-review › Article in proceedings – Annual report year: 2015