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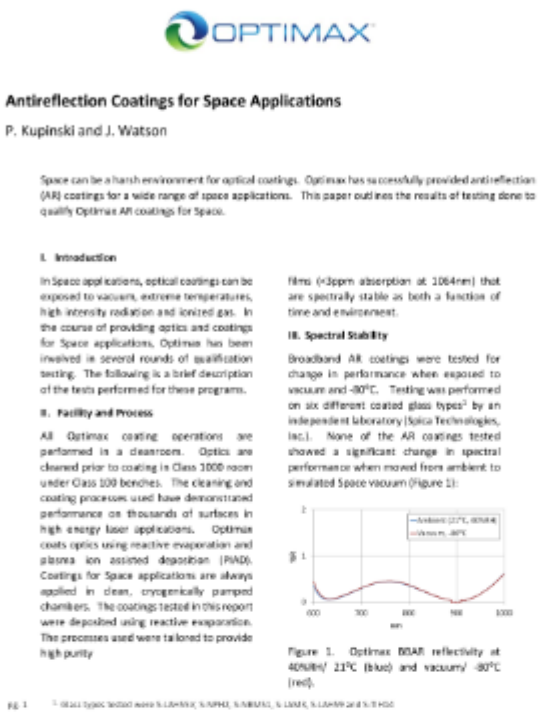

OPTIMAX

Antireflection Coatings for Space Applications

P. Kupinski and J. Watson

Space can be a harsh environment for optical coatings. Optimax has successfully provided antireflection (AR) coatings for a wide range of space applications. This paper outlines the results of testing done to qualify Optimax AR coatings for Space.

I. Introduction

In Space applications, optical coatings can be exposed to vacuum, extreme temperatures, high intensity radiation and ionized gas. In the course of providing optics and coatings for Space applications, Optimax has been involved in several rounds of qualification testing. The following is a brief description of the tests performed for these programs.

II. Facility and Process

All Optimax coating operations are performed in a cleanroom. Optics are cleaned prior to coating in Class 1000 room under Class 100 benches. The cleaning and coating processes used have demonstrated performance on thousands of surfaces in high energy laser applications. Optimax coats optics using reactive evaporation and plasma ion assisted deposition (PIAD). Coatings for Space applications are always applied in clean, cryogenically pumped chambers. The coatings tested in this report were deposited using reactive evaporation. The processes used were tailored to provide high purity films (<3ppm absorption at 1064nm) that are spectrally stable as both a function of time and environment.

III. Spectral Stability

Broadband AR coatings were tested for change in performance when exposed to vacuum and -80°C. Testing was performed on six different coated glass types[1] by an independent laboratory (Spica Technologies, Inc.). None of the AR coatings tested showed a significant change in spectral performance when moved from ambient to simulated Space vacuum (Figure 1):

Figure 1. Optimax BBAR reflectivity at 40%RH/ 21°C (blue) and vacuum/ -80°C (red).

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