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Original Paper

Comparative Study on the Outgassing Rate of Materials Using Different Methods

Y. Luo[1,2], X. Wu[1,2], K. Wang[1,2] and Y. Wang[1,2]

1) Academy of Opto-Electronics (AOE), Chinese Academy of Sciences, Beijing 100094, China
2) Beijing Engineering Research Center of Excimer Laser, Beijing 100094, China

Y. Luo
Email: luoyan@aoe.ac.cn

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Abstract

With so many material outgassing test methodologies, three of them were available at Academy of OptoElectronics, which are the pressure rise method (PR), the throughput method and the switching between two pumping paths method (SPP). In order to compare the data derived via different methods and decide the proper concept to conduct a test, outgassing experiments of two pumping speeds with various periods were performed on one material using three methods, following the tool's detection limit was demonstrated at first. The results reveal that a lower outgassing rate is achieved with longer evacuation time and a higher pumping speed. What's more, a quite smaller value is obtained by the PR method against the other two, and the SPP method gets a little lower one as opposed to the throughput. Additionally, it is concluded that the PR method, with one simple chamber, is relatively more suitable for measuring high outgassing-amount materials, while the sample with lower one is more preferable to use the throughput or SPP method, which has a more complicated structure in contrast. However, different from the second approach, a little higher uncertainty may be acquired by the third method, in spite that it has the lowest detection limit.

Keywords

Outgassing rate measurement; The pressure rise method; The throughput method; The switching between two pumping paths method; Detection limit