

**Bi$_2$Ti$_2$O$_7**

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### 1

MEMS

SiO$_2$, Si$_3$N$_4$, Ta$_2$O$_5$, TiO$_2$, ... 

Si$_3$N$_4$ 3.8, 6.0, 9H (NEMS)

Mitsubishi (Ba, Sr) TiO$_2$, 256M DRAM, (Ba, Sr)TiO$_3$, ... (NEC)

Samsung, Ta$_2$O$_5$, 1G DRAM, Cava, Bell, ... 

OLED, (126, 1MHz, 1) [2]. 1999, Sony, Au, MOCVD, TiN/Ti/n$^+$, ... 25, Ta$_2$O$_5$, Wilk, ... 15-30 HfO$_2$, Hf-

SiO$_2$, ZrO$_2$, ... ZrSiO$_2$, ... [6,7], ... 

Bi$_2$Ti$_2$O$_7$, Bi(C$_2$H$_5$)$_3$ (100), Si (111), ... 500, Bi$_2$Ti$_2$O$_7$, ... 8, ... KrF, ... 4. 

### 2

Na$_{x}$Bi$_{1-x}$TiO$_3$, ... 2(484nm), ... Bi$_2$Ti$_2$O$_7$, ... 1-60Hz, ... 700mJ, ... 30W, ... 10mm

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Pulse laser deposition synthesis of dielectric films and their optical absorption properties

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1. Introduction

The synthesis of dielectric films by pulse laser deposition and their optical absorption properties

2. Experimental

The growth of a single-layer dielectric film was performed on quartz glass substrate. The film was used to test its dielectric properties. X-ray diffractometer (XRD) was used to determine the phase composition of the sample (Figure 1). Scanning electron microscope (SEM) was employed to observe the sample's microstructure and morphology. UV-2100 spectrophotometer was used to test the sample's optical absorption performance. Dielectric measurements were performed at a frequency of 1kHz-1MHz.

3. Results and discussion

The results are shown in Figure 2 and Figure 3. The SEM graphs of the BIT-3 sample are displayed in Figure 2 (a) Surface (b) Fractured. Dielectric properties of BIT-3 film are shown in Figure 3.

4. Conclusion

Pulse laser deposition is a suitable method for the synthesis of dielectric films with high optical absorption performance.
对沉积在透紫外石英玻璃片上的薄膜测试了其光吸收特性。从图的结果可以发现薄膜在紫外光区的紫外光区相对于石英基底有着非常强的紫外吸收能力。此外，在左有存在一个吸收峰可能存在与薄膜中的缺陷有关系，需要做进一步试验来分析。

图（薄膜的光吸收性能）

结论

利用准分子激光器控制单脉冲能量为0.8mJ，脉冲频率为1.8B，氧压控制在0.5Pa，基底温度在612k通过退火处理合成了纯的薄膜。薄膜表面比较均匀，厚度大约612nm。介电性能测试表明，薄膜的介电常数约612，且随频率变化非常稳定。其介电损耗大约612，此光吸收曲线表明薄膜在紫外光区有着非常强的紫外吸收能力。

参考文献

Preparation of Dielectric Bi$_2$Ti$_2$O$_7$ Thin Film by Pulsed Laser Deposition Method and Its Optical Absorption Properties*

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Abstract: Dielectric Bi$_2$Ti$_2$O$_7$ thin films are synthesized by the pulsed laser deposition with the energy of single pulse $\sim$350mJ, the pulse frequency $\sim$5Hz, and suitable substrate temperature. The results indicate that the pure and homogeneous films can be obtained when the SiO$_2$ substrate temperature was controlled in the range of 500$\sim$600°C. The dielectric constant is about 18.2 for the BIT-3 film sample, dielectric loss is about 0.015 and has good frequency stability. The dielectric film has good absorptivity in the range of 200$\sim$450nm wavelength, which can be attractive for technological applications for the MEMS devices.

Key words: Bi$_2$Ti$_2$O$_7$; pulsed laser deposition method; dielectric properties; optical absorption

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