基于硫族玻璃梯度谐振腔的非易失动态彩色显示技术

DOI: 10.12086/oee.2025.251002.h02

目前基于液晶分子等光学参数动态可调材料的显示技术已展现出动态调控结构色的能力，但其存在颜色易失、耗能大、响应速度慢的问题。因此，如何实现非易失、快速、动态显示，仍然是一个挑战。

大连理工大学曹暾教授团队与厦门大学洪明辉院士团队联合报道了一种基于硫族玻璃梯度谐振腔的非易失动态显示技术，实现了亚衍射分辨率彩色图像的动态显示。该技术主要基于金-硫族玻璃-空气的非对称法布里-珀罗 (FP) 谐振腔结构，通过飞秒激光改变表面硫族玻璃的厚度，构成梯度谐振腔，这种梯度式 FP 空腔阵列可以提供高对比度、鲜艳的颜色以及宽色域，并且颜色可以通过控制硫族玻璃的晶格结构进一步动态改变。这项新技术无需光刻，具有低成本的特点。

研究人员还展示了该技术动态循环显色以及动态显示彩色图像的能力。通过调控激光的功率，循环调控硫族玻璃的晶格状态，实现样件青色和红色之间的循环变色。该方法为动态结构色显示技术提供了新思路，在彩色显示、防伪等领域具有广泛应用前景。

Opto-Electronic Advances, 2024, **7**(1): 230033.
https://www.oejournal.org/article/doi/10.29026/oea.2024.230033.

Non-volatile dynamically switchable color display via chalcogenide stepwise cavity resonators

DOI: 10.12086/oee.2025.251002.h02

At present, the display technology based on the dynamic adjustable optical parameters such as liquid crystal molecules has shown the ability to dynamically control the structural color, but it has the problems of volatile color, high energy consumption and slow response, which greatly limit its application. Therefore, how to achieve non-volatile, fast, dynamic display is still a challenge.

The research group of Prof. Tun Cao from Dalian University of Technology, together with the research group of Prof. Minghui Hong from Xiamen University, has proposed a non-volatile dynamic display technology based on the stepwise resonance cavity of chalcogenide. They have experimentally realized a lithography-free dynamically switchable color reflector by incorporating chalcogenide within an asymmetric stepwise pixelated Fabry–Pérot (FP) cavity array.

They have presented a dynamic color microprint ‘Bing Dwen Dwen’ illustrating the possibility of making arbitrary dynamic microprints. Moreover, their color reflector does not need any complex lithographic techniques during the fabrication, which significantly reduces the complexity and device cost. These color-varying devices based on the chalcogenide phase change materials may pave the path toward the next generation of inkless erasable papers or displays and offer camouflaging surfaces, compact systems, and signaling to engineer the spectrum of visible light.

Opto-Electronic Advances, 2024, **7**(1): 230033.
https://www.oejournal.org/article/doi/10.29026/oea.2024.230033.