can be microseconds in MR-doped liquid crystals [38]. Therefore we believed that much faster response times in our PhCs can be achieved.

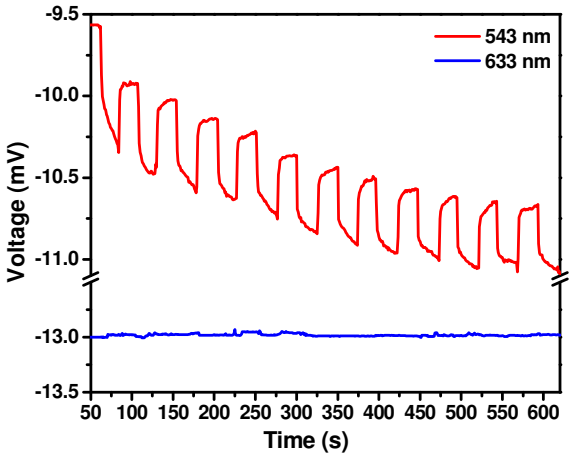

Fig. 5. Comparison of the optical switching effect for the red and green light diffraction.

4. Conclusion

We have demonstrated 2D absorbing PhCs that are based solely on the imaginary part of the refractive index. The azo-dye absorbance-associated refractive index was analyzed using the Kramers-Kronig relationship. The experimental results confirmed that only the light in the spectral range where the azo-dye absorbed was diffracted, indicating that purely absorbing PhCs were formed. Such absorbing PhCs also showed all-optically switchable diffraction properties due to the *trans-cis* isomerization of the azo-dye under the light pump. We believe that this fabrication technique can be extended to 3D fabrication and such kind of absorbing PhCs can find many photonic applications, such as optical switching, coherent and incoherent PhC structure manipulation, and soliton generation.

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