

Supplementary information

A pH and voltage dual-adjustment electrochromic material achieves multicolor change based on alizarin red and Dawson-type polyoxometalate

Jie Zhang,^a Yan-Yan Yang,^{*a} Shu-Ping Liu,^b Su-Yang Feng,^a Feng-Ru Li,^a Fang-Ting Chen,^a Xiao-Yang Yu^a and Xiao-Shu Qu,^{*a}

^a *College of Chemical and Pharmaceutical Engineering, Jilin Institute of Chemical Technology, Jilin City, 132022, P. R. China.*

^b *College of Tourism and Cuisine, Harbin University of Commerce, Harbin City, 150028, P. R. China.*

*Corresponding author. E-mail: yangyanyan@jlct.edu.cn.

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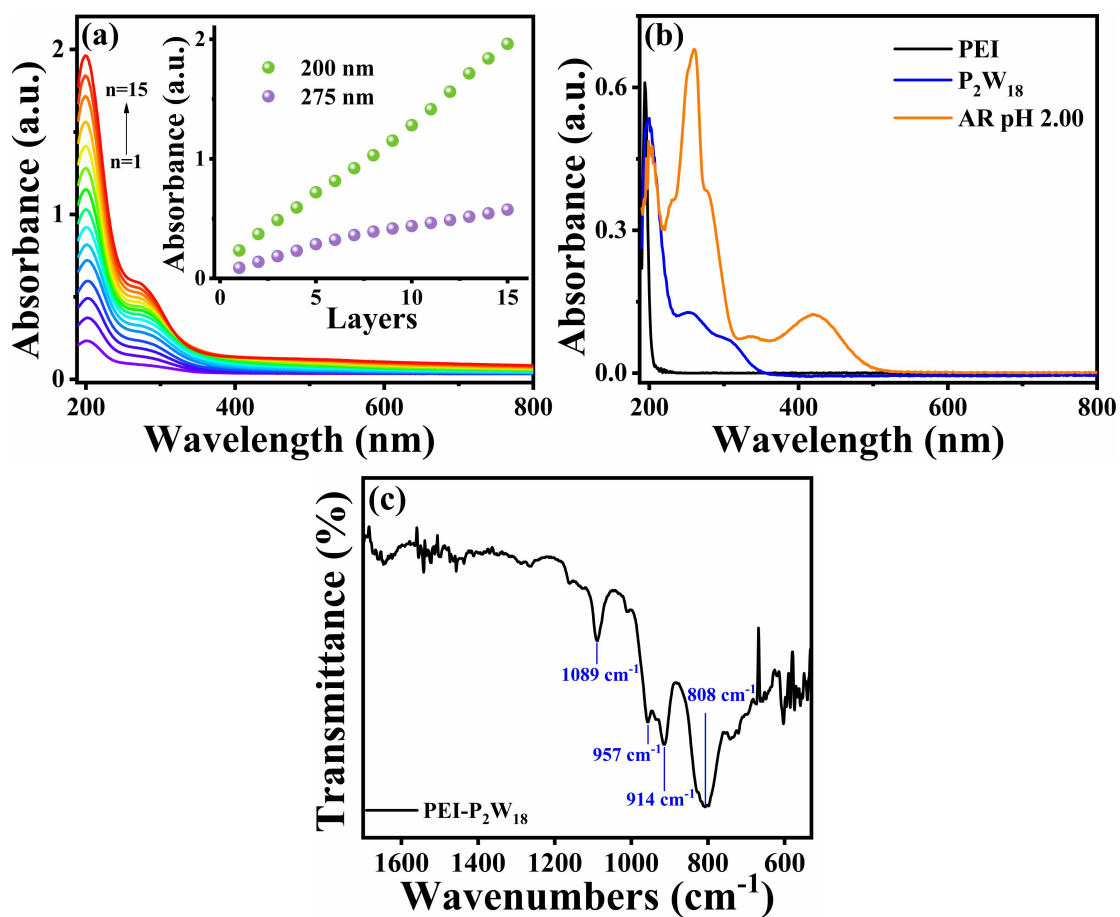


Figure.S1 (a) UV-vis absorption spectra on a quartz substrate of the PEI- P_2W_{18} film (number of cycles: 0–15), Inset: Plots of the absorbance values at 200 and 275 nm. (b) UV-Vis absorption spectra of PEI, P_2W_{18} and AR. (c) IR spectra of PEI- P_2W_{18} film.

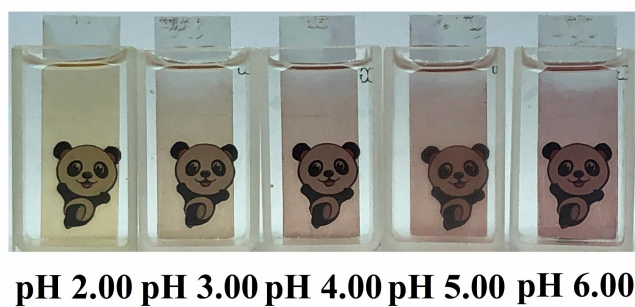


Figure.S2 Images for color of the P_2W_{18} -AR film in different pH value solutions.

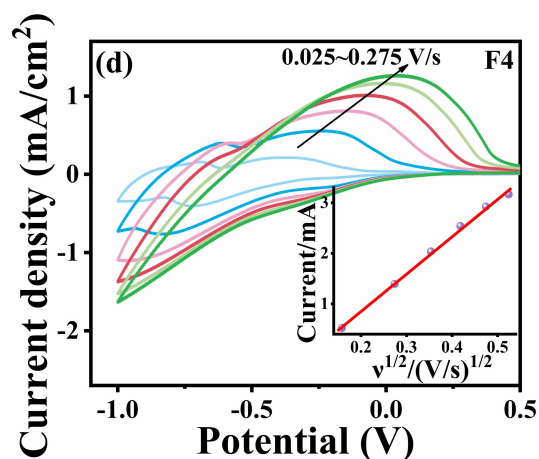


Figure.S3 Cyclic voltammetry curves of F4 at different scan rates (from inner to outer): 0.025, 0.075, 0.125, 0.175, 0.225, 0.275 V/s. Inset: the peak current density as a function of the square root of the scan rates.

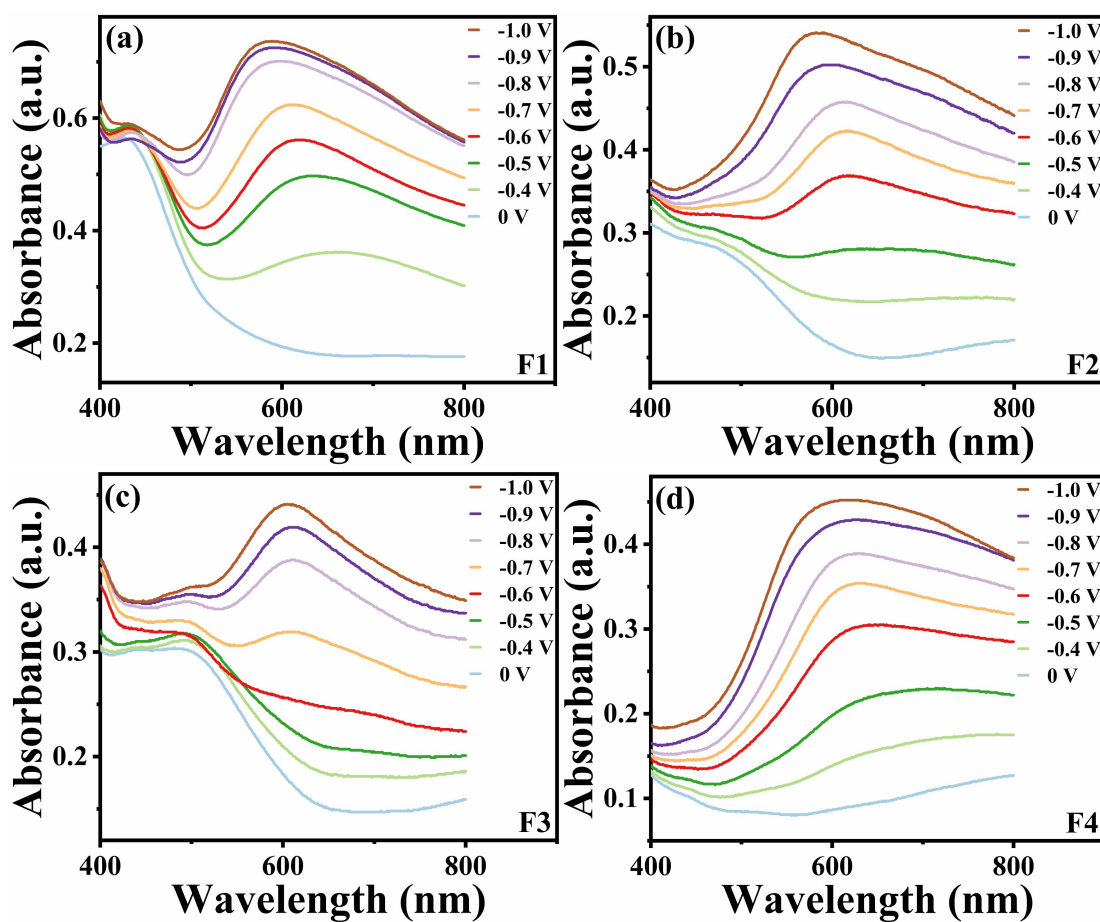


Figure.S4 UV-vis absorption spectra of F1-F4 films during the different applied potentials.

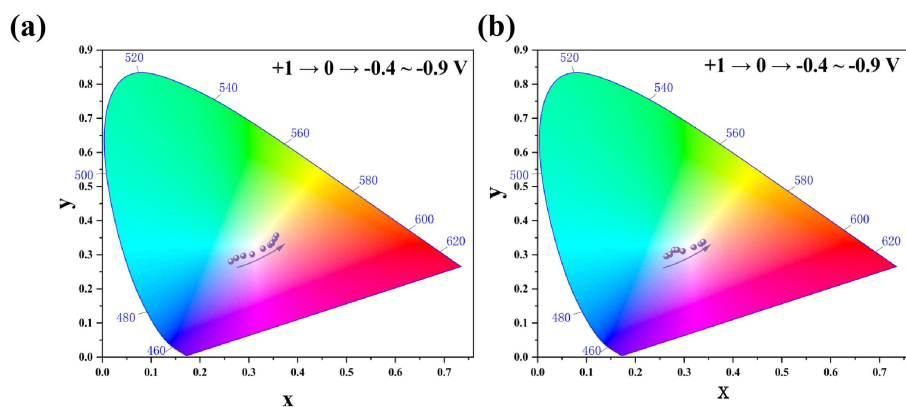


Figure.S5 CIE 1931 xy chromaticity space diagrams of (a) F2 and (b) F3.

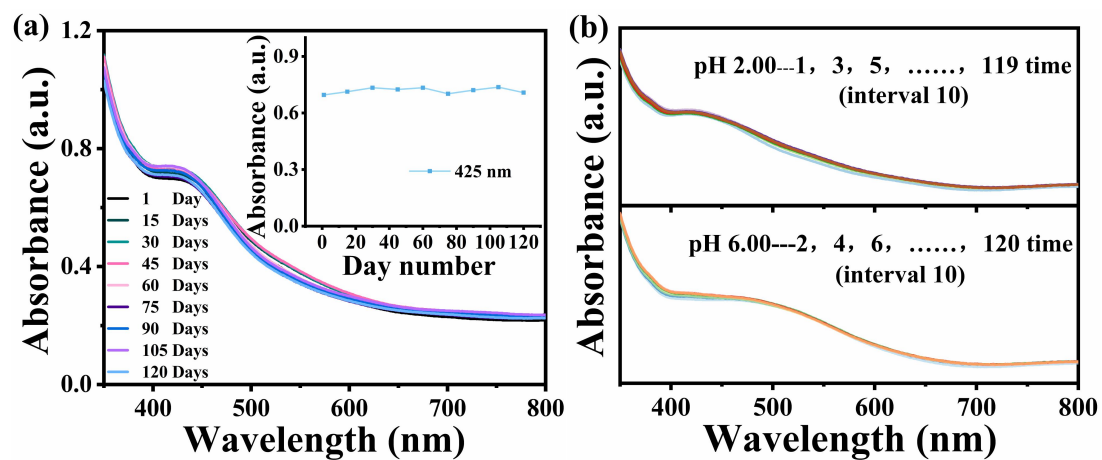


Figure.S6 (a) The time stability and (b) cycle stability in two solutions of the P_2W_{18} -AR film.

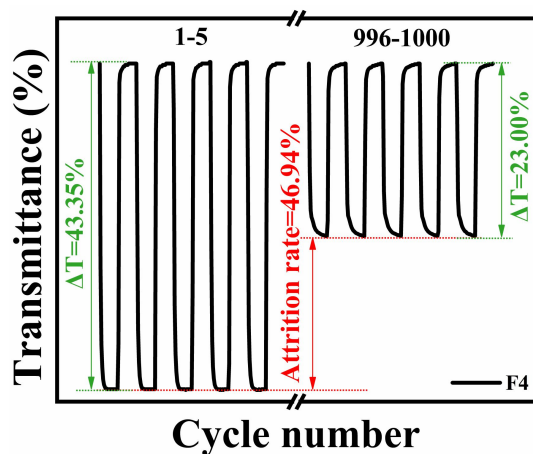


Figure.S7 The stability chart of F4 film at 650 nm.