Supplementary Information

A magnetically responsive photonic crystal of graphene oxide nanosheets

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Supplementary Figures

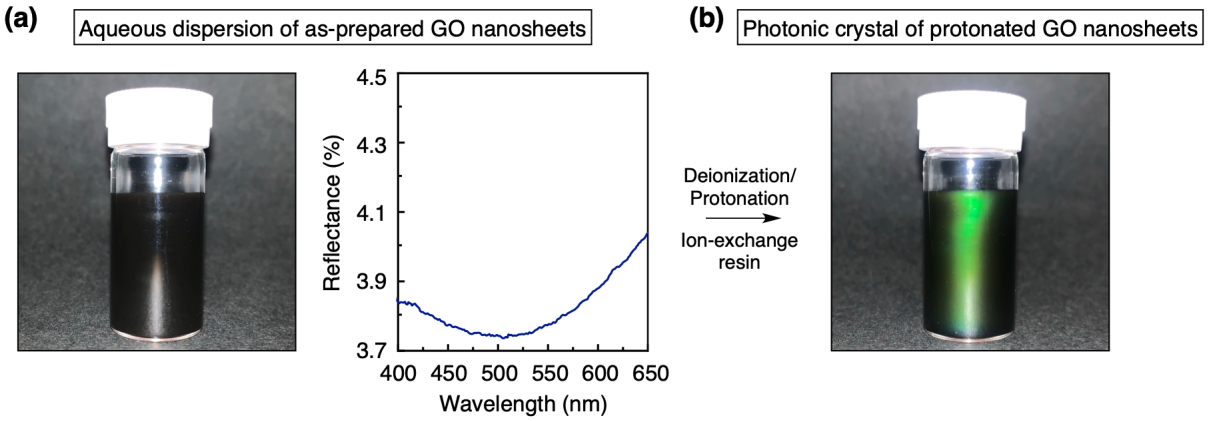

Fig. S1 (a) Optical image (left) and a corresponding reflection spectrum (right) of an aqueous dispersion of as-prepared graphene oxide (GO) nanosheets ([GO] = 0.3 wt%). (b) Optical image of an aqueous dispersion of protonated GO nanosheets ([GO] = 0.3 wt%) prepared by the deionization/protonation process using an ion-exchange resin.

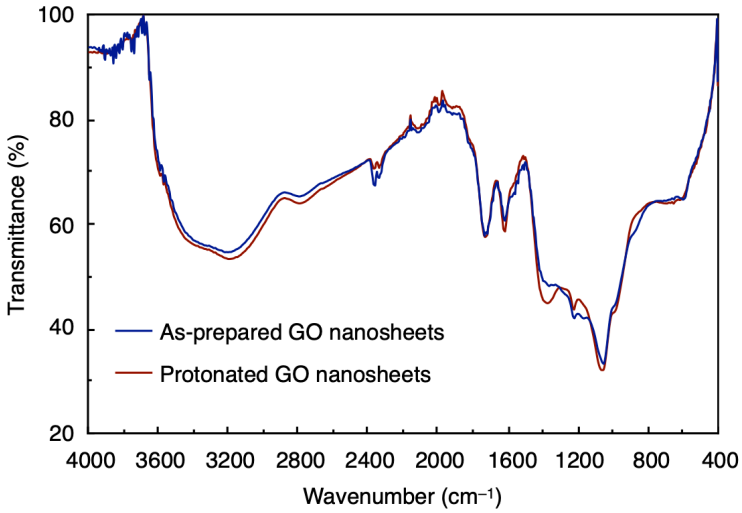

Fig. S2 Attenuated total reflectance (ATR) FT-IR spectra of dried thin films of as-prepared and protonated GO nanosheets before and after the treatment with an ion-exchange resin, respectively.

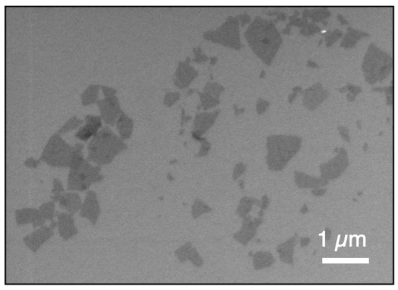

Fig. S3 Field emission scanning electron microscopy (FE-SEM) image of protonated GO nanosheets.

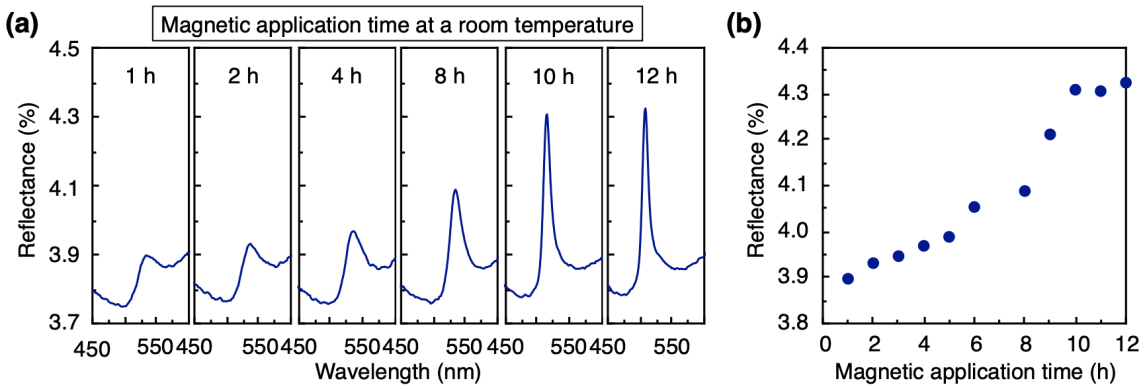

Fig. S4 (a) Representative reflection spectra and (b) plots of peak intensity in the spectra as a function of the application time of a 12 T magnetic field at a room temperature using a photonic crystal of GO nanosheets ([GO] = 0.3 wt%) with the magnetic treatment along the *y*-axis.

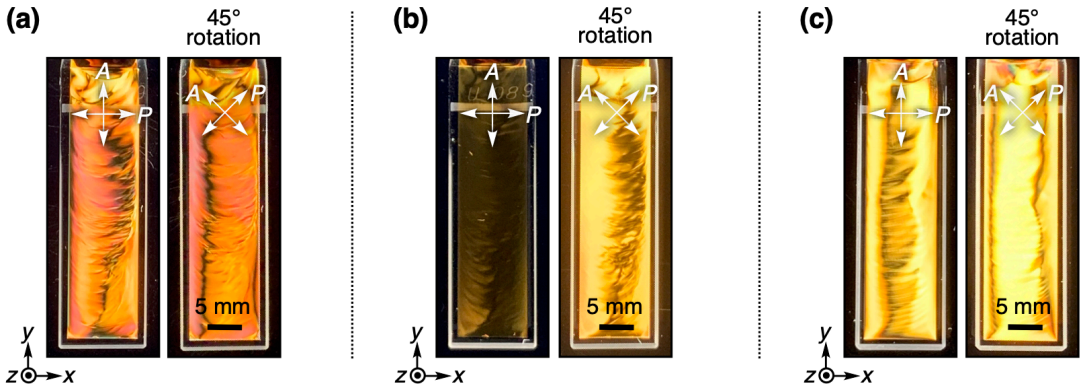

Fig. S5 (a–c) Polarized optical images under crossed Nicols with different rotation angles of 0° (left) and 45° (right) of a photonic crystal of GO nanosheets (GO = 0.3 wt%) prepared without a magnetic application (a) and with a 12 T magnetic application along the *y*-axis (b) and *z*-axis (c).

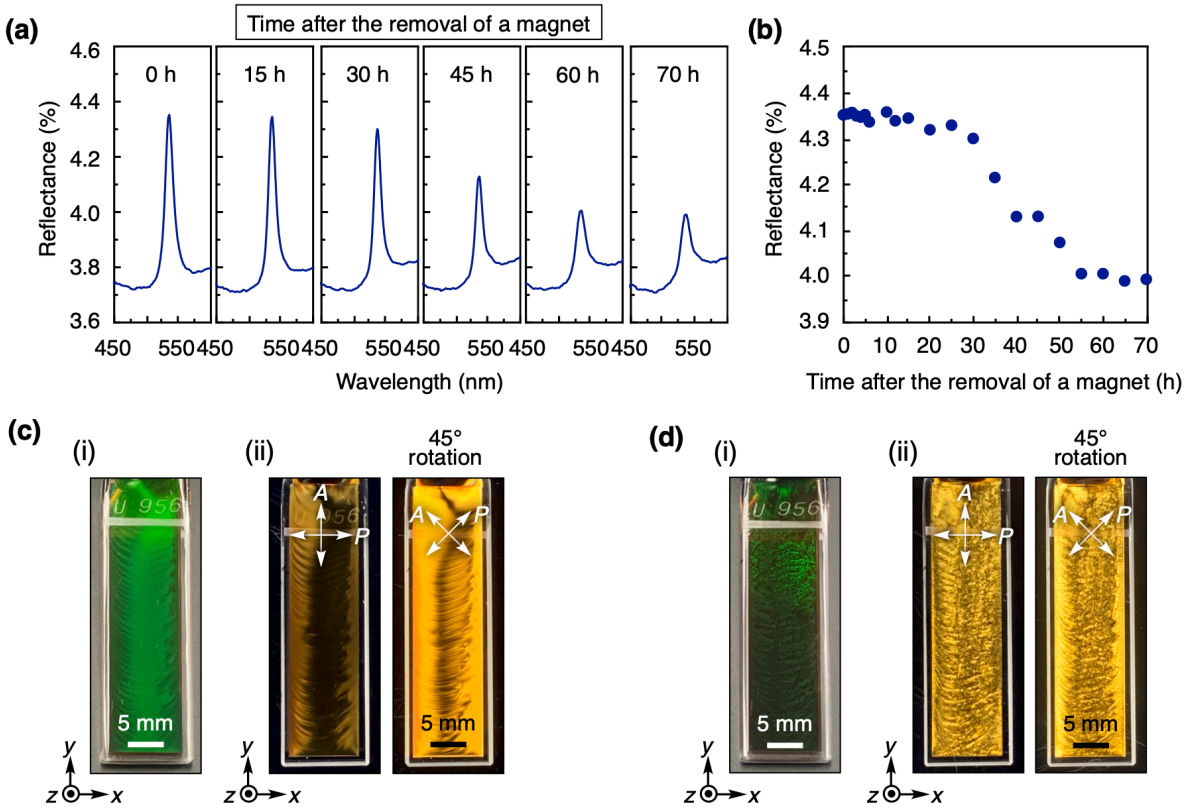

Fig. S6 (a) Representative reflection spectra and (b) plots of peak intensity in the spectra at a room temperature as a function of the time after the removal of a 12 T magnetic field using a photonic crystal of GO nanosheets ([GO] = 0.3 wt%) after the magnetic treatment for 3 h along the *y*-axis. (c,d) Optical images (i) and polarized optical images under crossed Nicols (ii) with different rotation angles of 0° (left) and 45° (right) of the photonic crystal at 0 h (c) and 70 h (d) after the removal of a 12 T magnetic field.

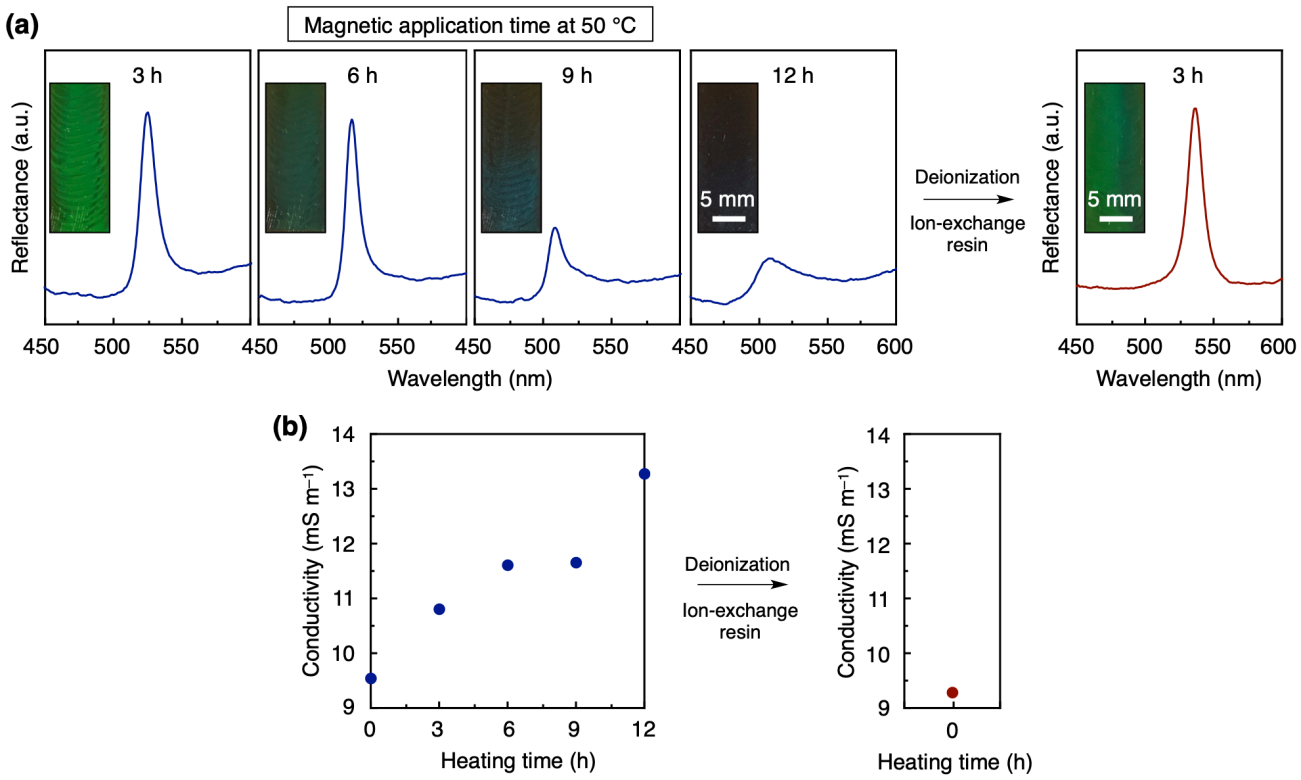

Fig. S7 (a) Reflection spectra and optical images (inset) as a function of the application time of a 12 T magnetic field at 50 °C using a photonic crystal of GO nanosheets ([GO] = 0.3 wt%) with the magnetic treatment along the *y*-axis. After the magnetic treatment for 12 h, the photonic crystal was deionized using an ion-exchange resin for 1 h, leading to a recovery of the structural color. (b) Plots of conductivity values of a photonic crystal of GO nanosheets ([GO] = 0.3 wt%) as a function of heating time at 50 °C without a magnetic field. After the heating for 12 h, the photonic crystal was deionized using an ion-exchange resin for 1 h, resulting in a recovery of its conductivity.

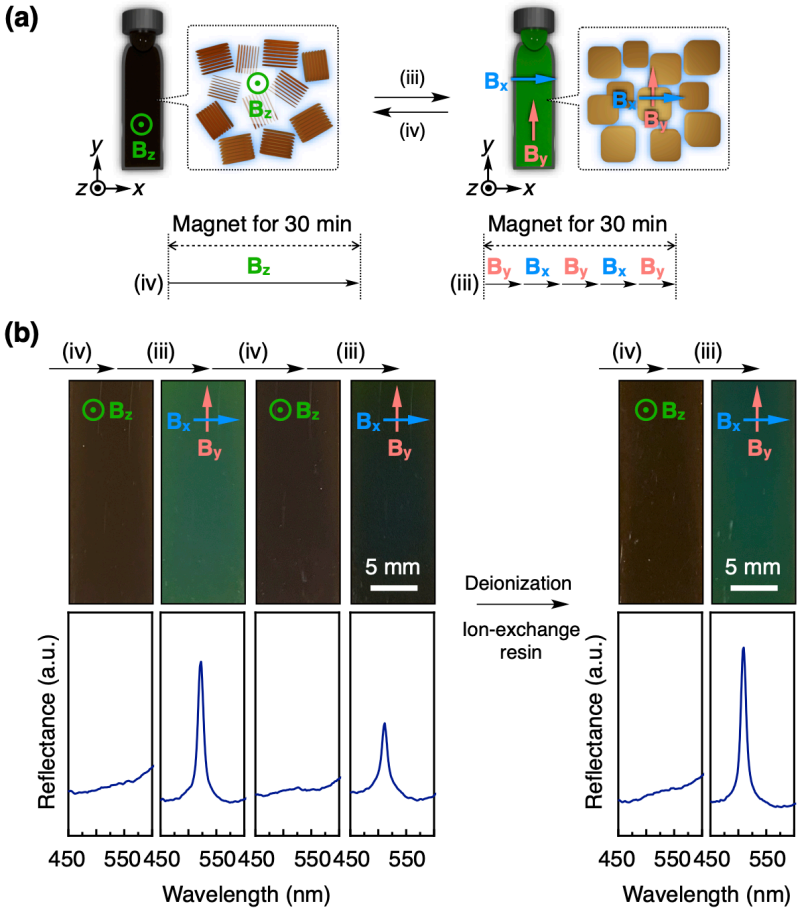

Fig. S8 (a) Magnetic application processes (iii–iv) and their schematic illustrations for color switching. (b) Optical images (upper) and corresponding reflection spectra (lower) of a photonic crystal of GO nanosheets ([GO] = 0.3 wt%) after repeating processes (iii) and (iv). After a deionization process using an ion-exchange resin for 1 h, the heat-induced ionic species were removed, resulting in a recovery of the structural color.