

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: The dual-responsive film showed great synchronism and excellent electrochromic and actuating performances in 1 M LiClO₄/propylene carbonate electrolyte.

File Name: Supplementary Movie 2

Description: The pseudocapacitive IPMC actuator bent to the left and right under the constant voltage of 1.8 V and -1.8 V, respectively.