Supplementary Data:

S1:

Wide angle XRD pattern of BMM TOFs (CH1+CH) after heat treatment at 400°C for 2h.

S2:

(a) Two CM coatings produce about 200nm thick TOF film. The thickness of only one single CM, about 100nm can be foreseen. (b) monomodal C1+C2 TOF.

S3:
One electrochromic switch in 8th cycle for BMM CH1+CM2 TOF.
Chronoamperometry measurements ($8^{th}$ cycle) in voltage steps between -0.4 V and 0.4 V (vs Ag/AgCl) of bimodal CH1+CM2 TOF, (b) integrated amounts of charge and recorded transmittance at 650 nm at the end of reductive and oxidative cycles. Measurement was performed at voltage steps between -0.4 V and 0.4 V (vs Ag/AgCl). (c) Reproducibility between different cycles.

Upon the insertion and extraction of protons, the colours of BMM TOFs switched between blue (coloured state) and transparent (Fig.7a, inset), respectively. The recorded transmittance changes accordingly. The transmittances at 650 nm recorded at the end of coloration and bleaching were read and marked on the figure S3(b). The EC switching behaviours at different cycles (4, 8 and half 9$^{th}$) are quite consistent, as can be seen from S3(c).