

Supporting Information

Rapid High-Contrast Reversible Coloration of $\text{Ba}_3\text{MgSi}_2\text{O}_8:\text{Pr}^{3+}$ Photochromic Materials for Rewritable Light-Printing

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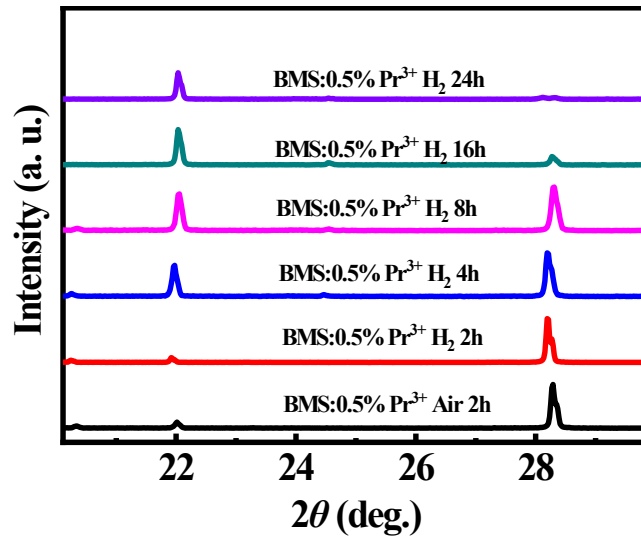


Fig. S1 The fine scanning of XRD spectra in the 2θ range of 23–29°.

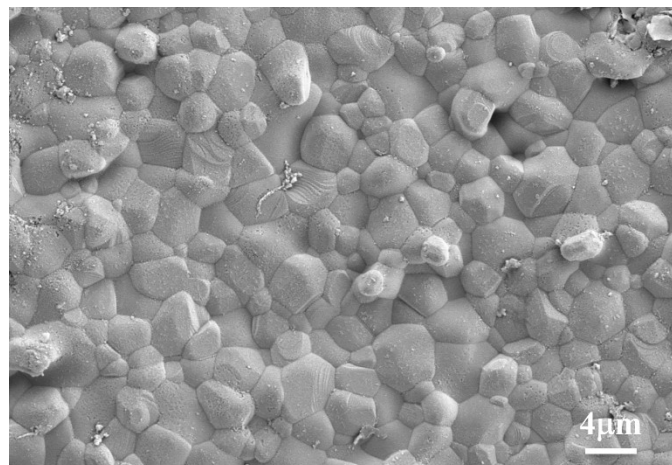


Fig. S2 SEM micrographs of the BMS:0.5%Pr³⁺ ceramics

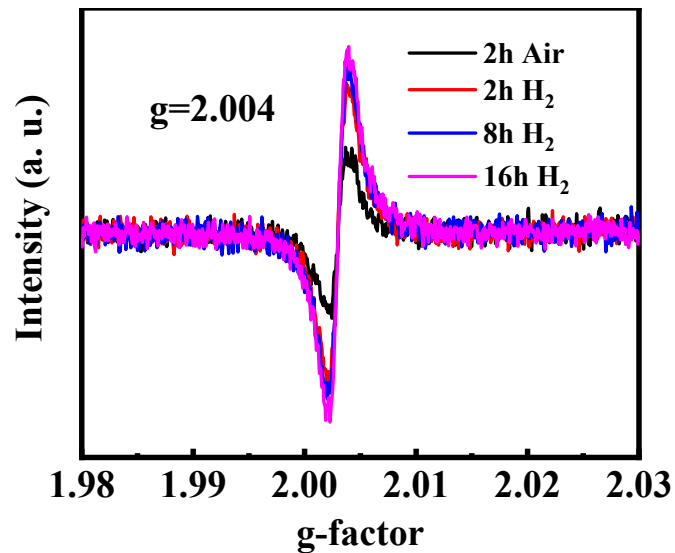


Fig. S3 The EPR results of BMS:0.5%Pr³⁺ ceramics sintered in Air for 2h and in reduction atmosphere for 2h, 8h, and 16h before illumination.

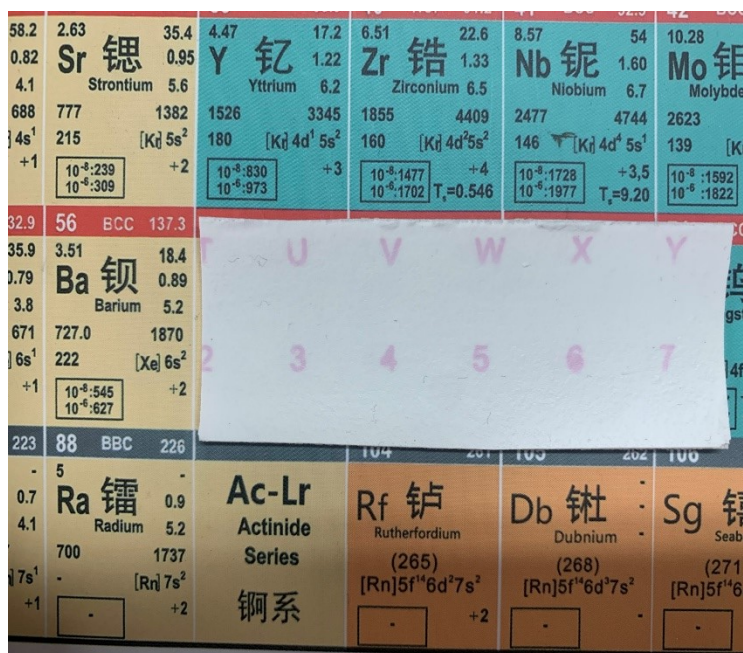


Fig. S4 The rewritable paper after 30 cycles of printing and erasing

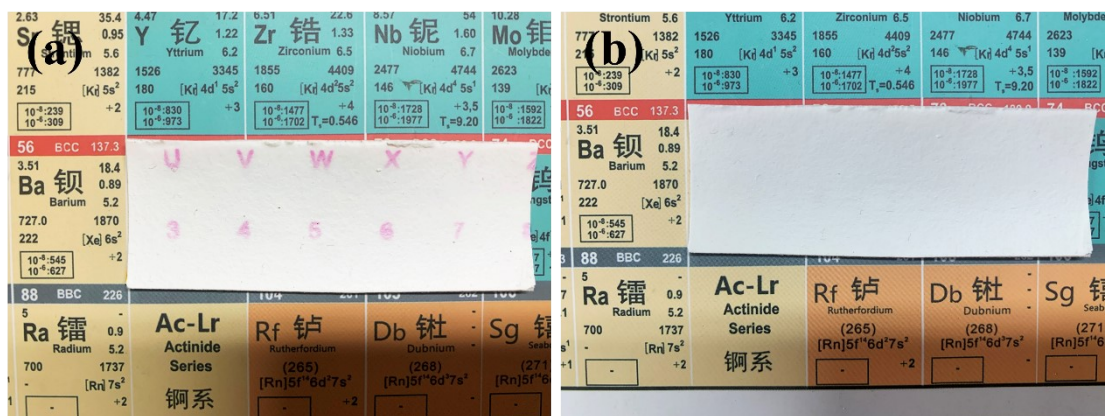


Fig. S5 (a) Light-printing with 254 nm UV-lamp, (b) bleached in 50 °C for 30 minutes.

category	Materials	Coloration contrast (%)	Ref.
organic	poly(ethylene oxide)- <i>b</i> -PSPA	88.5	1
	diheteroarylethenes	86.6	2
	Stenhouse adducts	85.1	3
	diarylethene	72.9	4
	m-benzenedicarboxylate	30.8	5
inorganic	Ba ₃ MgSi ₂ O ₈ : Pr ³⁺	77.1	This work
	Ba(Zr _{0.16} Mg _{0.28} Ta _{0.56})O ₃ : Pr ³⁺	64.1	6
	BaMgSiO ₄ : Mn ²⁺	53.5	7
	SrBi ₂ Nb ₂ O ₉ :Yb/Ho/Mo	42.1	8
	(K _{0.5} Na _{0.5})NbO ₃ :Eu	39.2	9
	(K _{0.5} Na _{0.5})NbO ₃ :Ho/Yb	39.0	10
	Bi ₄ Ti ₃ O ₁₂ : Pr	36.7	11
	(K _{0.5} Na _{0.5})NbO ₃ : Nd	36.4	12
	(K _{0.5} Na _{0.5})NbO ₃ : Sm	36.1	13
	PbWO ₄ :Yb ³⁺ , Er ³⁺	29.4	14
	Bi ₄ Ti ₃ O ₁₂ :Er ³⁺	29.0	15
	(K _{0.5} Na _{0.5})NbO ₃ -SrZrO ₃ : Sm ³⁺	29.0	16
	(K _{0.5} Na _{0.5})NbO ₃ : Tb	26.3	17
	BaMgSiO ₄ :Eu ³⁺	24.7	18
	BaMgSiO ₄ :Bi ³⁺	24.7	19
	Na _{0.5} Bi _{2.5} Nb ₂ O ₉ : Er ³⁺	22.6	20
	(K _{0.5} Na _{0.5})NbO ₃ : Pr/Er	22.2	21
	(K _{0.5} Na _{0.5})NbO ₃ :Dy	20.5	22
	Na _{0.5} Bi _{0.5} TiO ₃ : Er ³⁺	20.0	23
	Sr ₂ SnO ₄ :Sm ³⁺	19.4	24
	Na _{0.5} Bi _{2.5} Nb ₂ O ₉ :Er ³⁺	18.4	25
	(K _{0.5} Na _{0.5})NbO ₃ :Pr	18.1	26
	CaWO ₄ : Yb ³⁺ , Er ³⁺ ,	18.2	27
KSr ₂ Nb ₅ O ₁₅ :Sm ³⁺	11.2	28	

Table S1 The coloration contrast of typical ferroelectrics, robust oxides and oorganic photochromic materials

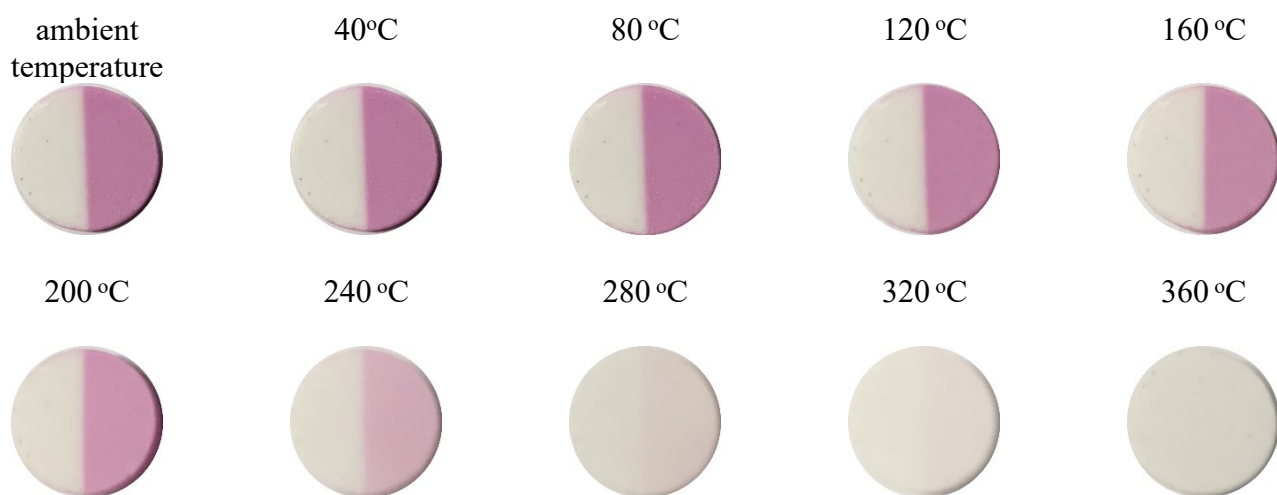


Table S2 The profile display of BMS:0.5%Pr³⁺ 16h H₂ after each heat treatment.

Supplementary Movies

Movie S1: Instant handwriting with a UV lase (325 nm) on rewritable paper.

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